Prepared for:
U.S. Agency for International Development
Health Insurance Organization, Egypt

Contract Number:
263-0170-C-00-3042-00

MANAGEMENT MODULE

FUNCTIONAL AND DETAILED DESIGN

Deliverables 5 and 6

USAID Project Number: 263-0170
[Develop a Detailed and Updated Management Information System for the Egyptian Health Insurance Organization, Cost Recovery Program]

Prepared by:
The MAXIMUS, Chemonics, Arabsoft Project Team

Date:
June 24, 1996

June 24, 1996

Mr. Carl Abdou Rahmaan
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USAID/Egypt
106 Kasr El Aini Street, 7th Floor
Cairo Center Building
Cairo, Egypt

Ref: Project Number 263-0170-C-00-3042-00

Dear Mr. Abdou Rahmaan:

MAXIMUS is pleased to submit the functional and detailed designs for the Management Module of the Health Insurance Organization (HIO) management information system. These designs were developed based on consultation with numerous individuals from both HIO and contract staff. This document represents Deliverables 5 and 6 for this module.

The Management Module is a tool that allows managers at all levels — Headquarters, branch, and facility — to monitor and evaluate use patterns and activities at HIO facilities. Through its extensive reporting capabilities, the module offers the kind of information that HIO managers need to make well-informed decisions and to take action to enhance the efficiency and utilization of HIO healthcare operations.

Please note that this module is not self sufficient. For the module to fulfill its potential, the reports and data it provides must be interpreted and acted upon. Currently, the HIO does not have trained Management Analysts. Qualified, full-time Management Analysts are essential if the module is to be used effectively and for its benefits to become manifest. Therefore, we recommend that, in preparation for the implementation of this module, the HIO pursue the identification and training of individuals who can act as Management Analysts.

We welcome a discussion of any questions or concerns you may have regarding this document. To avoid expending additional level of effort reworking the designs, we request you provide any comments within four weeks of our submission of this document. If you have any questions, please do not hesitate to contact me.

Sincerely,

Leslie Graham
Chief of Party

June 24, 1996

Dr. Nabil El Mehairy
Chairman
Health Insurance Organization
Heliopolis
Cairo, Egypt

Dear Dr. El Mehairy:

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We ask that you review this document 1) to verify that the design reflects what was discussed during consultation with your staff, and 2) to validate that the reports produced by the module will enhance management's ability to monitor and predict trends in HIO operations. Please pay close attention to Section 3, General Assumptions, and Section 4, General Recommendations. The module's success depends on the conditions discussed in these sections being true, or the HIO's ability to accomplish them. Also, please note any organizational, policy, or procedural changes which may be necessary for the success of the module.

We look forward to your comments and suggestions. If you have any questions about this functional design document, please do not hesitate to contact me.

Sincerely,

Leslie Graham
Chief of Party

cc: Mr. Carl Abdou Rahmaan
General Faisal Taie, HIO

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LIST OF EXHIBITS

LIST OF EXHIBITS (continued)

SECTION 1

INTRODUCTION

1 INTRODUCTION

This document presents the functional and detailed designs of the Management Module. The Management Module will be implemented, along with the Health Insurance Organization (HIO) Management Information System (MIS), at HIO Headquarters, the HIO MIS Center, branches, and facilities. The implementation details of this system's functions may differ from one site type to the other, but the core elements are the same at all levels. This document presents a global view of all Management Module functions as they will appear at the different levels of implementation. This system is being developed as part of the HIO MIS under the umbrella of the HIO and the U.S. Agency for International Development (USAID).

1.1 Purpose of the Document

This design document is intended to describe the main functions performed by the Management Module as well as to provide detailed descriptions of its menus, screens, and report layouts. This document also serves as a baseline for review, comments, and change before the design is put into place and coding of the system begins.

At a high level, this document describes the following:

- the contents of the Management Module;
- why the Management Module is needed;
- who, organizationally, will use the module;
- what functions the module will provide for those users;
- what organizational changes must be implemented along with the system for it be effective; and
- any assumptions and minimum requirements upon which the design is based.

At the detailed level, this design describes the look and flow of the Management Module, including screen designs, menus, and report outputs.

1.2 Process Used to Develop this Design

The Management Module requirements portrayed in this document were created eliciting the input of many people, each with a different expertise, currently working on the Cost Recovery For Health HIO MIS Project. Appendix D is a list of individuals interviewed as part of the analysis for this module. The input for this design comes from members of the MAXIMUS contractor team, drawing on their experience with other systems, knowledge of

needs of the HIO management structure, and their first-hand working experience with HIO managers — the final users of this module.

Since the management reporting functions encompassed in this module do not currently exist within the HIO, each person who was interviewed gave input, in his or her area of expertise, as to what functions the module should perform. This document presents a picture of how the module will look after integrating its parts. Modifications and enhancements to the module are expected as the design is further defined and additional needs come to light.

1.3 Intended Audience

This document presents both a high-level and a technical specification based upon discussions held thus far. It introduces the module, as perceived by contributing project staff, to the other parties involved in developing the overall functionality of the Management Module.

It is expected that the audience for this document consists of the people who contributed to the development of this document as well as the managers of the HIO MIS and the HIO. This document should be reviewed:

- to verify that the functions described meet the requirements of the intent of the module;
- to validate that the menu structures and reports meet the needs of the users;
- to determine whether or not the assumptions used are valid;
- to understand what minimum requirements have to be met to ensure the success of the module; and
- to commit to the organizational changes outlined.

In addition, project management should read this document to ensure that this module is of benefit to the project and the ongoing activities of the Health Insurance Organization. It should also be reviewed to ensure that it is consistent with the long-term objectives of the HIO reorganization/reengineering effort.

SECTION 2

GENERAL OVERVIEW OF THIS MODULE

2 GENERAL OVERVIEW OF THIS MODULE

The development of a Management Information System for use by the Health Insurance Organization is a large undertaking, of which the Management Module is one piece. Exhibit 2-1 is a logframe summary of project activities. Exhibit 2-2 is a logframe summary of the Management Module.

This section provides a high-level overview of the modules to be included in the HIO MIS and the interaction between these modules. This section presents a high-level view only. A technical design description is provided in Section 4 and in the appendices

2.1 Overview of the HIO MIS

The HIO MIS is being developed in phases. Software applicable to management is being developed in the third phase.

The modules in the third phase are:

- Management, and
- Quality Assurance.

Neither of these modules stands alone. Each uses information provided by other modules including those developed in phases one and two. The purpose of these modules is to provide management and quality assurance information about the HIO. With this improved level of information, HIO management can make well-informed and timely decisions regarding cost containment and service provision; a decision-making capacity that is essential as the organization continues to grow and evolve.

The HIO MIS consists of distributed, but integrated, databases. All MIS applications for a polyclinic, hospital, or branch reside on the computer at that facility. Therefore, within a facility all applications have access to the database on that facility's machine. For example, the Outpatient Visit Report accesses data already entered through Beneficiary Registration Module and does not need to be reentered.

Data sharing is transparent to the user. The MIS applications are designed to share data and the user needs to do nothing to have this happen. However, the fact that all data are shareable between applications does not mean that the database is open to all. Individuals and operational areas without need to access certain data are not given the opportunity to do so. Exhibit 2-3 depicts data being shared among applications.

Exhibit 2-1 (page 1 of 2)
LOGICAL FRAMEWORK
OVERALL PROJECT

PROJECT NARRATIVE	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Project Goal Improve HIO ability to raise treatment quality & contain costs.	**End of Project Status** Lower costs for drugs per patient. Shorter lengths of stay in hospitals. Reduced number of patient visits per episode of illness. Lower cost of treatment per patient. Higher proportion of favorable outcomes per patient.	Statistical data from HIO. Statistical data from MIS.	HIO supports a MIS. HIO involved in MIS design. HIO provides resources. HIO adopts policies & procedures to maximize use of system.
Project Purpose Build & implement a MIS throughout the HIO.	**Measures of Achievement** Number of HIO sites automated & using MIS. Number of S/W application modules running.	Site visits. End of Project status evaluation.	HIO managers involved in system implementation.
Outputs MIS systems in use in facilities. System generated reports. Trained HIO staff.	**Magnitude of Outputs** 75+ systems installed in Egypt. Hardcopy and electronic reports to targeted users. 1000+ staff trained.	Site visits. Project reports. End of Project status evaluation.	Staff available for training. Enough qualified staff found for each job. HIO purchases needed equipment & supplies. HIO obtains telecom. lines.

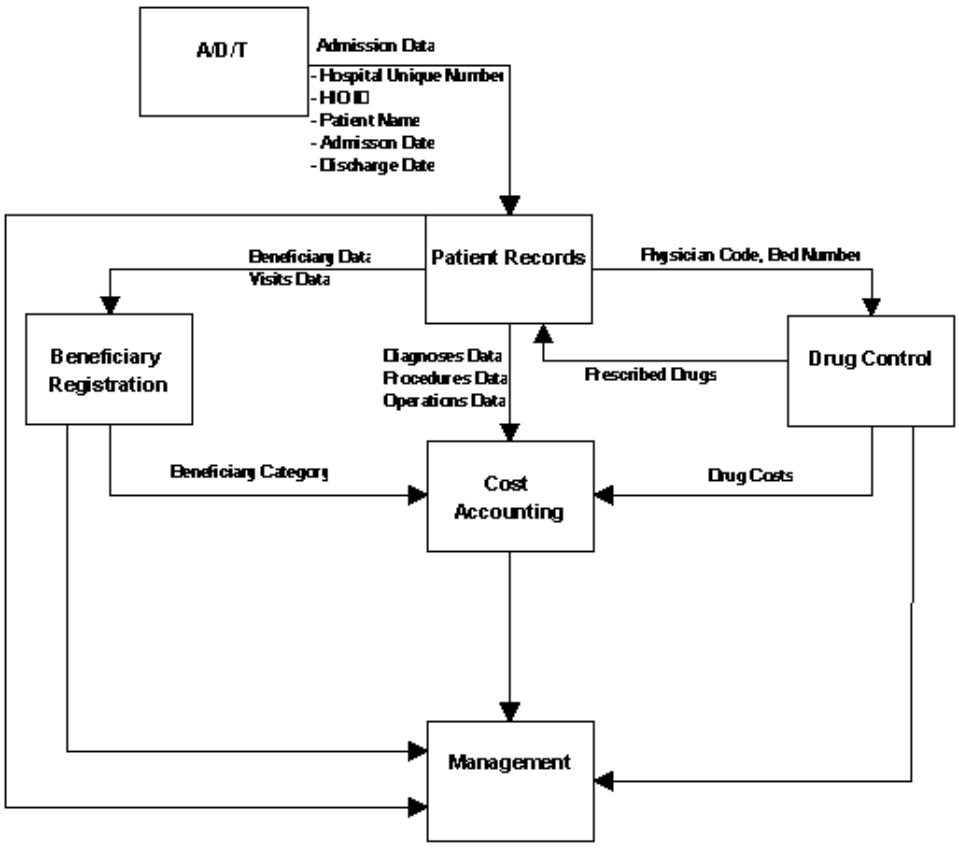
Exhibit 2-1 (page 2 of 2)
LOGICAL FRAMEWORK
OVERALL PROJECT

PROJECT NARRATIVE	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Inputs	**Magnitude of Inputs**		
USAID funding - Training - Technical assistance - Commodities	$21M+	Financial records.	MIS remains a priority of the HIO. Resource support from HIO continues.
HIO Project Resources - Vehicles - Office space - Furniture - Electronic power - Telecom. lines - Computer supplies - Data and Data Conversion personnel	4 project vehicles. Al Ahram Building. Furnish each clinic computer room. 250 KV transformer. Computer supplies continuously available. Data exchange protocols. Data tapes from SIO & PIO.	Status reports. End of project evaluation. Site visits. Monthly data tapes.	SIO & PIO work with HIO to provide regular database updates tapes.
HIO Regular Resources - Facilities - Clinical - Administrative	8 Computer centers. Medical practice committee. Drug formulary committee. Management analysis office. Computer supplies budget. Telecom. cost budget. Hardware maintenance budget.		

Exhibit 2-2
LOGICAL FRAMEWORK
MANAGEMENT MODULE

PROJECT NARRATIVE	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Module Goal Improve HIO management capabilities through access to data.	**End of Project Status** Provide accurate statistics on HIO service provision. Generate reports and statistics.	Management reports.	HIO uses module data. HIO adopts policies and procedures to maximize use of system and ensures accuracy of data input.
Module Purpose Provide HIO management with the information required to make informed management decisions and perform comparative analysis between like facilities.	**Measures of Achievement** Number of HIO managers using the Management Module reports.	Site visits. End of Project Status Evaluation.	HIO managers involved in system implementation.
Outputs Management information used by HIO managers. System generated reports. Trained HIO management staff.	**Magnitude of Outputs** Clinic, hospital, branch, and Headquarters managers using the modules. Electronic, hardcopy, and graphical reports.	Site visits. Project reports. End of Project Status Evaluation.	Managers available for training. Supplies available for hard copy reports.
Inputs HIO decision-making resources.	**Magnitude of Inputs** Clinic, hospital, branch, and Headquarters managers.	Status reports. End of Project Status Evaluation. Site visits.	Resource support from HIO continues.

Exhibit 2-3
INTERFACES BETWEEN HIO MIS MODULES



2.2 Overview of the Management Module

The Management Module is designed to stimulate actions that increase the efficiency and quality of services provided at HIO facilities. It provides the information necessary to promote continuous improvement of processes and productivity in the HIO.

The Management Module is a tool that allows polyclinic and hospital managers to monitor and evaluate use patterns activities at their facilities. This module also allows branch managers to perform comparative analysis of facilities within a branch. With the module, Headquarters management will be provided with the information needed to view the overall efficiency and utilization of HIO healthcare operations.

The principal function of this module is to produce management reports and graphs. These reports are designed so that the focus of the reports is similar, regardless of whether they are generated at the facility, branch, or Headquarters. All reports are directed at measuring the same activities. This allows the branch managers to review the same indicators and measures that the facility managers are viewing, and Headquarters managers to review the same indicators and measures that branch managers are viewing.

Headquarters reports focus on the highest management level. The concern of these reports is the overall stability and future of the HIO. Thus, the reports for Headquarters are designed to support monitoring, evaluation, and planning for the continuing efficiency of the HIO. Headquarters reports aggregate data by branch, with "drill down" capabilities to view detailed information. They allow Headquarters staff to review the current status of operations and to plan for the future by setting and enforcing policy and guidelines as indicated by information provided on these reports.

Branch reports focus on the next lower level — management of the hospitals, polyclinics, and pharmacies. The branch is responsible for ensuring compliance with procedures and policies implemented by HIO Headquarters. Branch-level reports will provide the information needed to determine if procedures are being followed and where additional attention must be placed.

Facility reports focus on the lowest level. The concern of these reports is on the performance of individual activities within a hospital, polyclinic, or pharmacy. Users of information at this level can monitor and investigate performance to a very fine level of detail.

Reports for this module are purposefully designed to promote awareness and activity which cultivates and enhances operations at hospitals, polyclinics, and pharmacies. All data reported in this module are captured as a byproduct of clinical and administrative use of the HIO MIS. No additional data collection and entry are required for this module. It is for this reason that reports outlined in this module pertain to clinical activities rather than to facility maintenance or to other nonclinical activities in a healthcare facility.

2.2.1 Report Types

Four types of statistical reports will be available from this module: comparative performance, rank order, 12-month trend, and exception. By design, data presented at Headquarters is aggregated from the branch reports and data presented at the branches is aggregated from the facility reports under that branch. For ease of discussion in this document, the reports displayed are at the facility level and aggregate data for the wards or physicians in the facility. As presented in section 4, some reports aggregate facility-level data by specialty, ward, or physician. Branch-level reports aggregate data by specialty or facility, and Headquarters-level reports aggregate data by specialty, facility, or branch.

2.2.1.1 Comparative Performance Reports

Comparative performance reports present data, as current at run time, for a facility, branch, or Headquarters. These reports provide for comparison of that unit's performance to itself over a period of time. The report presents data on:

- performance for the previous month,
- performance for the current month,

- o percent change from last month,
- o performance for the current month of the previous year,
- o percent change from the previous year,
- o a rolling 12-month total, and
- o a rolling 12-month average.

This allows managers to review comparative monthly statistics for the reported subject area and to observe the results of process change decisions and actions. Percentages are presented on comparative performance reports to normalize the raw data.

The general structure of the facility-level comparative performance report and associated bar graph are presented in Exhibits 2-4 and 2-5 respectively. Comparative performance reports run for a branch provide breakdowns by facility. Similarly, when they are run for Headquarters, they provide breakdowns by branch. Specific reports are detailed in section 4.

2.2.1.2 Rank Order Reports

Rank order reports present the indicator data and relative ranking for the current month. Where appropriate, the total and average values are presented. These reports provide comparisons of like units for the same period of time. They are designed to help managers quickly compare rank orders of facilities or branches and determine rank order changes from month to month. For example, branch managers can compare data between facilities in the branch and investigate the possible causes of extreme deviations from the average.

A rank order is assigned to each unit each month where from "1" to "n" where "n" is the total number of units (i.e., physicians, facilities, or branches). A rank of "1" indicates the best value.

> **Note:** The best value might not be the highest value in certain circumstances, as for some indicators a low value is preferable. For example, the preferred value for "Contracted Referrals" is low rather than high.

Values with greater than a ten percent positive or negative change from the previous month are noted. The graph for the rank order format presents the data for each unit reported. The rank order report format and graph are presented in Exhibits 2-6 and 2-7 respectively.

Exhibit 2-4
COMPARATIVE PERFORMANCE REPORT

Hospital Name

MM/YY Run Date

Section	Last Month	Current Month	% Change from Last Month	Current Month Previous Year	% Change from Previous Year	12-month Total	12-month Average
Ward 1							
Ward 2							
Ward N							
	Total	Total	Average	Total	Average		Total

Exhibit 2-5
NCE BAR GRAPH

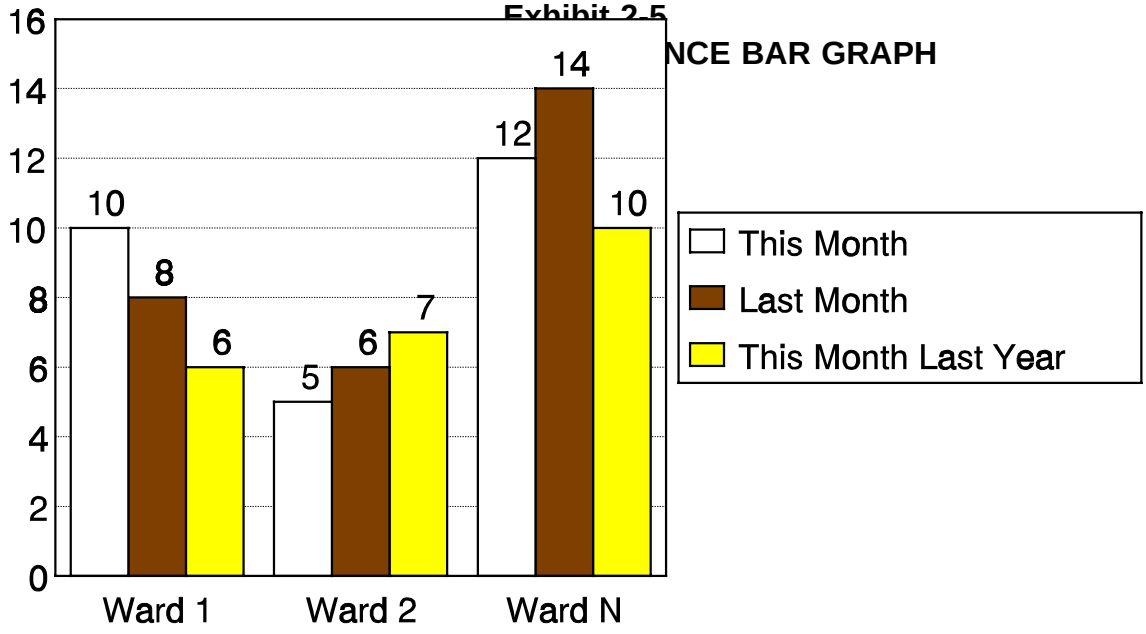


Exhibit 2-6
RANK ORDER REPORT

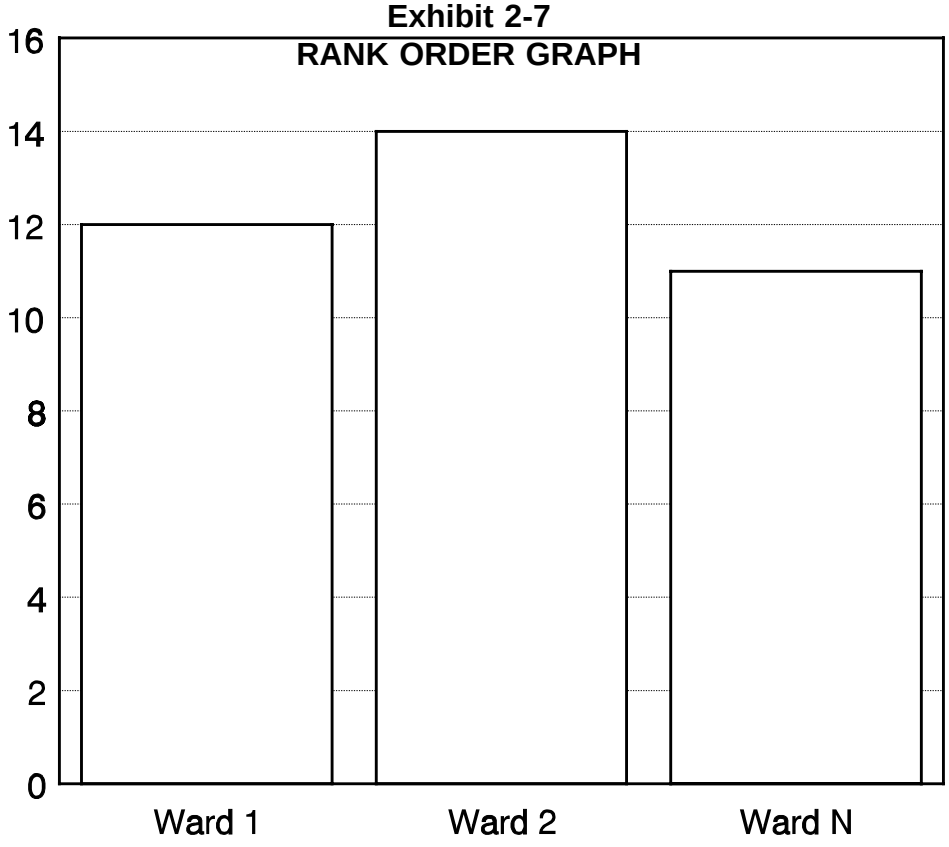
Hospital Name

MM/YY Run Date

Category	Ward 1 Value	Ward 1 Rank	Ward 2 Value	Ward 2 Rank	Ward N Value	Ward N Rank	12-Month Total	Ward Monthly Average
	(a)		(a)		(a)			
	Total		Total		Total		Total	

(a) A "plus" (+) is noted for any value showing an increase of more than 10% from the previous month. A "minus" (-) is noted for any value showing an decrease of more than 10% from the previous month.

Exhibit 2-7
RANK ORDER GRAPH



2.2.1.3 Trend Reports

Trend reports present the monthly data for the indicators for a rolling 12-month period. Here again, percentages are used rather than raw numbers to normalize the data. These reports allow management to analyze how the data changes over a 12-month period. For example, management might want to review the length of stay values for hospitals over a 12-month period to determine how a change in the discharge procedure affects the length of stay.

Line graphs are usually associated with trend reports. Line graphs show the monthly indicator value for the 12-month period. Where reports have multiple indicators, the specification of the indicator to graph is made when the graph is run. The trend report format and associated graph are presented in Exhibit 2-8 and 2-9, respectively.

2.2.1.4 Exception Reports

Exception reports present the names of three cases which meet the exception criteria appropriate to the particular report. They all present the count for the total population upon which this selection is based. Cases are selected at random from the total population of cases meeting the exception criteria and are presented as examples of cases on which to focus case review efforts. The listing of cases is intended to make the management action dictated by the reports clearer. Not all reports have associated exception reports. If they do, the exception conditions for the reports are outlined in the detailed description of each report in Section 4.

> **Note**: Exception reports are generated for a facility only. They are used to present a sampling of cases recommended for case review. The default for the exception report is to list only three cases meeting the exception criteria. If a more comprehensive review is required, it is possible to print a list of the entire population.

No graphs are associated with exception reports. The exception report format is presented in Exhibit 2-10.

2.2.2 Report Levels

Each HIO management level — facility, branch, and Headquarters — is able to generate comparative performance, rank order, and trend reports. Only facilities have the ability to generate exception reports. By design, data presented at Headquarters aggregates data presented on branch reports. Data presented at branches aggregates data presented on facility reports under that branch. This approach allows managers at different organizational levels to review the same type of data at different levels of aggregation.

Exhibit 2-8
TREND REPORT

Hospital Name

Run Date

Section	Current Month (n)	Month n-1	Month n-2	Month n-12	12-month Total	12-month Average
Ward 1						
Ward 2						
Ward N						
	Total	Total	Total	Total	Total	Average

Exhibit 2-9
TREND LINE GRAPH

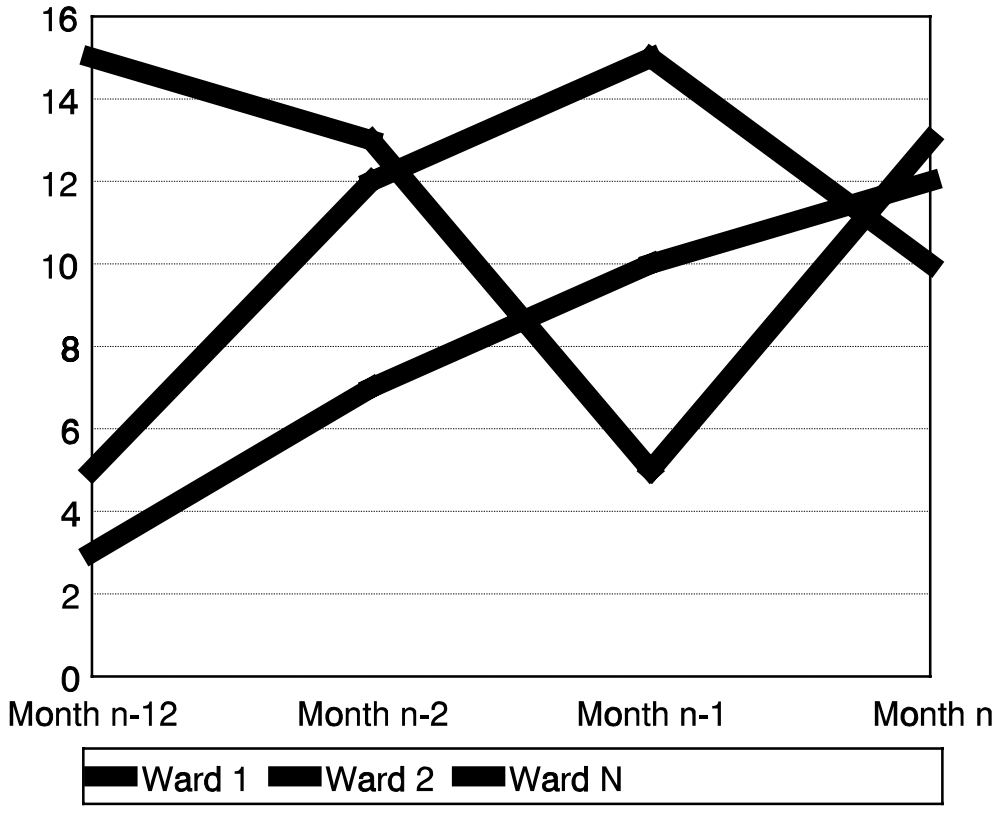


Exhibit 2-10
EXCEPTION REPORT

Facility Name

Reporting Period Run Date

Case ID	Beneficiary Name	Value	Total Population
Case ID 1	Beneficiary 1		
Case ID 2	Beneficiary 2		
Case ID N	Beneficiary N		
Count			

2.2.2.1 Facility

Facility-level reports are generated by facility Management Analysts. These reports are also available at the branch and Headquarters Management Departments. By design, these reports present data for the previous month, unless otherwise specified at run time. The Management Module at the facilities is accessible through the existing UNIX system. No graphics capabilities are available at the facilities.

2.2.2.2 Branch

Branch-level reports are generated by the branch Management Department. By design, these reports present data aggregated by facility for the previous month, unless otherwise specified at run time. The branch Management Module is run in a Microsoft Windows environment, allowing for the graphics capabilities presented in Section 2.2.1.

Branch-level reports are designed to help branch managers detect a problem in a facility and to suggest questions that should be asked of the facility manager regarding the problem. This promotes more interaction between the branch manager and facility managers, and demands that facility managers understand facility-level reports. At the discretion of the branch manager, the branch-level reports and graphs can be distributed to the facilities to promote comparative analysis between facilities.

The Branch Management Department also has the ability to generate facility-specific reports and graph the results as presented in Section 2.2.1.

2.2.2.3 Headquarters

Headquarters-level reports are generated monthly by the Headquarters Management Department. By design, these reports present data aggregated for the previous month, unless otherwise specified at run time. The Headquarters Management Module is run in a Microsoft Windows environment allowing for the graphics capabilities discussed in Section 2.2.1.

Headquarters-level reports are designed to help the Headquarters Integrated Medical Services Director oversee management in the HIO. When a problem is detected, these reports stimulate questions of facility or branch managers regarding the problem. This promotes more interaction between Headquarters management and branch and facility managers, and demands that those managers understand reports produced at their levels. At the discretion of the HIO Chairman, Headquarters-level reports and graphs can be distributed to the branches to promote comparative analysis between branches.

Headquarters managers will also have the ability to generate branch- and facility-specific reports and graph the results as presented in Section 2.2.1.

SECTION 3

GENERAL ASSUMPTIONS

3 GENERAL ASSUMPTIONS

This section describes the assumptions — important conditions — required for the module to work successfully and efficiently. It is important for reviewers of this document to read this section and determine that the conditions are either already in place, or can be implemented.

3.1 Hardware Assumptions

This design assumes each branch will have a personal computer (PC) on which to run Management Module reports and graphs. This PC can be placed in the computer room. The Headquarters layout is assumed to be a Novell local area network configuration with PCs available for management staff. Except for a dot-matrix printer for report generation, no special hardware is required at facilities. A high-quality laser printer will be available for report and graphics generation at branches at Headquarters.

3.2 Training Assumptions

The following training assumptions apply to the Management Module:

- Proper training is essential if HIO managers are to understand the management reports generated from the Management Module. HIO top-level management and Management Analysts must be trained to interpret the reports and use the information presented for planning and decision making.

- The Computer Operators are trained to use this module to generate the reports.

- HIO facility, branch, and Headquarters management are trained to request and expect these reports monthly.

- Physicians and other medical providers, both HIO and HIO-contracted, are trained in the use of the International Classification of Diseases, 9th Revision (ICD-9) and the locally-developed Common Procedure Terminology (CPT) codes. **This responsibility for this training effort is a continuing responsibility of the HIO.**

3.3 Process and Procedural Assumptions

The following process and procedural assumptions apply to the Management Module:

- ICD-9 and the locally-developed CPT codes are used consistently and accurately by physicians and other medical providers (both HIO and

HIO-contracted). This allows management reports to present staffing requirements and costs associated with various diagnoses and procedures.

- o Service provision data from the phase one and phase two modules are available at the facilities.

3.4 Management Report and Graph Assumptions

Caution must be taken when reviewing the statistical reports presented in the Management Module. Reported data, if taken only at face value and not examined in its context, can be deceptive and lead to incorrect assumptions regarding its meaning. This, in turn, could lead to an ineffective or inappropriate response.

For example, the average length of stay at hospital *X* may be higher than at hospital *Y* because hospital *X* handles chronic and long-term cases which require special care while hospital *Y* handles routine cases. This example highlights the fact that using unadjusted data can be misleading. It is not the only instance to consider but is intended to alert the user to the potential pitfalls of acting on information in reports without analyzing the particulars of a situation as well as its underlying data.

Every attempt has been made to account for these possibilities when designing the reports, but the manager must be aware of the pitfalls and use these reports only as a guide for further investigation, not as the sole source of information.

When reviewing graphs, it is important to pay attention to the scale used in the graph. It is quite possible that two bars in two graphs look the same, but that the scales used in the two graphs are different. All graphs in this module are designed to provide visual support to the reported data. It is for this reason that the module presents graphs only after a report is generated. A user is not able to generate a graph without the supporting report.

Other assumptions exist which affect the analysis of statistical reports and graphs. These assumptions and recommendations will be discussed during the training for users of the management reports.

SECTION 4

GENERAL RECOMMENDATIONS

4 GENERAL RECOMMENDATIONS

This section contains recommendations — also important conditions — necessary for the module to work successfully and efficiently. It is important for reviewers of this document to read this section and determine that the recommendations are either already in place, or can be implemented.

4.1 Staffing Recommendations

The staffing requirements for the Management Module suggest that Management Analysts specifically trained in statistics and management methods be assigned to Headquarters, branches, and facilities. These individuals are responsible for analyzing the monthly statistical management reports, for bringing potential problems to the attention of the HIO Chairman, branch managers, and facility managers as appropriate, and for enforcing management procedures implemented by HIO.

We recommend that HIO form a Management Analysis Department. We recommend that the Headquarters Management Analysis Department consist of a department chief supported by two Management Analysts. One analyst should focus review efforts on the hospitals, the other on polyclinics. They should report directly to the department chief and be responsible for:

- coordinating and directing process reviews as suggested by management report and graph analysis,
- working with branch managers to assist in review of branch management reports and to focus attention on improving the process of healthcare provision,
- developing and establishing operational protocols to improve the provision of care,
- implementing these protocols in HIO facilities, and
- assisting branch managers in their enforcement of these protocols at HIO facilities.

The actual location of the Headquarters Management Analysis Department within the new organizational structure is subject to change. It will be further defined as the HIO reorganization/reengineering initiative proceeds.

At branches, we recommend that the same organizational structure outlined for the Headquarters Management Analysis Department be followed. The branch department chief should supervise the two Management Analysts (one focused on hospitals, the other on polyclinics).

We also recommend that a Management Analyst be assigned to each facility. This person should work with the facility manager to ensure that operations and protocols developed at the branch and Headquarters are implemented at the facility. The Management Analyst should also work with the facility manager to analyze the management reports generated from this module.

These positions are integral to the success of the management efforts of the HIO. It is vitally important that these reports be reviewed closely and action taken to correct problems presented in them.

4.2 Medical Record Review Recommendations

Two reports in this module are intended to direct the medical record reviews which are seen as part of the management analysis process. Only the Length of Stay and Contracted Services reports have associated exception reports. The exception format for reports generated by this module is to guide medical reviewers to a sample of cases which require management analysis of the procedures followed.

Note: A table in the HIO MIS must be created to track medical record reviews. Columns for this table should be: Flag Date, Flag Report, and Review Date.

4.3 Aggregation and Migration of Data for Production of Management Report Recommendations

Unadjusted data for the reports are available directly from the facility-level applications of the HIO MIS. This data must be collected and aggregated at each facility to produce the management reports associated with this module. Separate tables for each report should be created to store the data, with a row in each table representing the reporting month and year, and the facility combination. Unadjusted data should be stored to facilitate the calculations of rates, modes, and other statistical indicators required by reports. All counts presented are for the reporting month unless otherwise specified.

The module produces five reports:

- Outpatient Visits,
- Occupancy and Length of Stay Rates,
- Discharge Profiles,
- Contracted Services, and
- Staff Utilization.

The Outpatient Visits Report requires a data table with the following fields:

- facility ID (primary key 1),
- reporting month and year (primary key 2),
- number of beneficiary visits,
- number of beneficiary visits — female,
- number of beneficiary visits — male,
- number of beneficiary visits — sex unknown,
- number of beneficiary visits — before 12:00 pm,
- number of beneficiary visits — after 12:00 pm,
- number of beneficiary visits — time unknown,
- number of beneficiary visits — aged less than 20 years,
- number of beneficiary visits — aged 20 to 29 years,
- number of beneficiary visits — aged 30 to 39 years,
- number of beneficiary visits — aged 40 to 49 years,
- number of beneficiary visits — aged 50 to 59 years,
- number of beneficiary visits — aged 60 to 69 years,
- number of beneficiary visits — aged more than 70 years,
- number of beneficiary visits — age unknown,
- number of primary ICD-9 code — ranked 1,
- number of primary ICD-9 code — ranked 2,
- number of primary ICD-9 code — ranked 3,
- number of primary ICD-9 code — ranked 4,
- number of primary ICD-9 code — ranked 5,

- number of primary ICD-9 code — other, and
- number of primary ICD-9 code — unknown.

The Occupancy and Length of Stay Rates Report requires a data table with the following fields:

- facility ID (primary key 1),
- ward ID (primary key 2),
- reporting month and year (primary key 3),
- number of admissions,
- number of admissions with LOS of 1 day or less,
- number of admissions with LOS of 2 days,
- number of admissions with LOS of 3 days,
- number of admissions with LOS of 4 days,
- number of admissions with LOS of 5 days,
- number of admissions with LOS of 6 days,
- number of admissions with LOS of 7 to 10 days,
- number of admissions with LOS of 10 days or more,
- number of beds available, and
- number of beds filled.

The Discharge Profiles Report requires a data table with the following fields:

- facility ID (primary key 1),
- ICD-9 code (primary key 2),
- reporting month and year (primary key 3),
- number of discharges,
- number of prescriptions written, and
- number of procedures performed.

The Contracted Services Report requires a data table with the following fields:

- facility ID (primary key 1),
- specialty (primary key 2),
- reporting month and year (primary key 3),
- number of services provided,
- number of contracted referrals,
- number of prescriptions written, and
- number of prescriptions unfilled.

The Staff Utilization Report requires a data table with the following fields:

- facility ID (primary key 1),
- specialty (primary key 2),
- reporting month and year (primary key 3),
- number of physicians, and
- number of visits.

SECTION 5

FUNCTIONAL DESIGN

5 FUNCTIONAL DESIGN

This section describes the functional design of the Management Module. This module consists of five reports and their associated graphs: Outpatient Visits, Occupancy and Length of Stay, Discharge Profiles, Contracted Services, and Staff Utilization. The comparative performance and trend report formats described in Section 2.2.1 are available at all levels. The exception report format can be run only at the facility level. Only reports (with accompanying graphs at the branch and Headquarters levels) are available in this module.

This section defines the reports of the Management Module without specifying implementation details. The structures outlined in Section 2 are followed as closely as is practical for the report's subject area. Shaded cells are not calculated as they are inappropriate for the report. Any required calculations are presented immediately following presentation of the report. If new reports are required in the future, the generic report formats described in Section 2 can be used.

The default reporting period for the comparative performance, rank order, and exception reports is the month previous to the current month. Specification of a specific month or year can be done at run time. The reporting period option is not, however, available for the trend format. A trend report always presents data aggregated by month for the 12 months preceding the reporting month.

Throughout this section, reports are presented as they appear when run for a facility. Graphs are presented as well, since graphs of facility-level data can be produced when the report is run at a branch or at Headquarters.

5.1 Outpatient Visits Report

The purpose of the Outpatient Visits Report is to provide managers with a profile of the beneficiaries using polyclinic and hospital outpatient facilities. The report aggregates outpatient beneficiary visits by gender, time of arrival, age, and diagnosis. Analysis of this information provides guidance on staffing requirements (among other things) at these facilities by allowing management to match staff levels to patient demands and physician specialty to patient needs.

5.1.1 Outpatient Visits — Comparative Performance Report

The Outpatient Visits — Comparative Performance Report presents data in two formats: detailed and summary. Both forms of this report allow management to become aware of the usage and staffing requirements at their outpatient facilities.

The detailed view calculates the values of the indicators for the polyclinic, branch, and the entire HIO as specified when the report is run. The following indicators are presented:

- o total number of beneficiary visits,
- o average number of visits per day,
- o percentage of visits by gender (male, female, and unknown),
- o percentage of visits by time of arrival (before noon, after noon, and unknown),
- o percentage of visits by age (under 20, 20-29, 30-39, 40-49, 50-59, 60-69, over 70, and unknown), and
- o percentage of visits by primary ICD-9 diagnosis (list of the five most prevalent diagnoses, other, and unknown).

The report as run for a polyclinic is shown in Exhibit 5-1. No graph is available for this report.

The summary-level view follows the standard comparative performance format presenting only the average visits per day and total monthly visits. This enables the report to be run at the branch level, aggregated by facility, and at the Headquarters level, aggregated by branch (default) or facility. The Outpatient Visits Comparative Performance General Report and Graph are shown in Exhibits 5-2 and 5-3, respectively. The graph represents the average daily visits.

5.1.2 Outpatient Visits — Rank Order Report

The Outpatient Visit — Rank Order Report allows managers to compare overall polyclinic utilization across a branch or the entire HIO. This report is not available at the facility level. The report presents the rank order for the following indicators:

- o average number of visits per day is noted with a plus (+) or minus (-) for facilities or branches that have had a greater than ten percent positive change in value (+) or negative change in value (-) from the last reporting period,
- o total number of visits, and
- o the five most common ICD-9 codes found as the primary diagnosis.

Analysis of these indicators provides management with a view of outpatient usage as well as common diagnoses at each outpatient facility. The latter will assist the HIO to target the most common ICD-9 diagnoses for development and adoption of clinical pathways, a goal of HIO quality assurance efforts. This report is available at the branch and Headquarters only. The Outpatient Visit — Rank Order Report and Graph for a branch are presented in Exhibits 5-4 and 5-5, respectively. The graph represents the average daily visits.

Exhibit 5-1
OUTPATIENT VISITS — COMPARATIVE PERFORMANCE REPORT (DETAIL)

Polyclinic Name

MM/YY Run Date

	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Average	12-Month Total
Total Monthly Visits			(a)		(b)	Average	
Average Number of Visits per Day			(a)		(b)	Average	Average
Gender							
Female			(a)		(b)		
Male			(a)		(b)		
Unknown			(a)		(b)		
Time							
am			(a)		(b)		
pm			(a)		(b)		
Unknown			(a)		(b)		
Age							
< 20			(a)		(b)		
20-29			(a)		(b)		
30-39			(a)		(b)		
40-49			(a)		(b)		
50-59			(a)		(b)		
60-69			(a)		(b)		
70 >			(a)		(b)		
Unknown			(a)		(b)		
Primary Diagnosis							
ICD-9 #1 (c)			(a)		(b)		
ICD-9 #2 (c)			(a)		(b)		
ICD-9 #3 (c)			(a)		(b)		
ICD-9 #4 (c)			(a)		(b)		
ICD-9 #5 (c)			(a)		(b)		
Other			(a)		(b)		
Unknown			(a)		(b)		

Special calculations are required for these columns:

(a) **% Change from Last Month** = $\frac{\text{Current Month - Last Month}}{\text{Current Month}} * 100$

(b) **% Change from Last Year** = $\frac{\text{Current Month This Year - Current Month Last Year}}{\text{Current Month This Year}} * 100$

(c) Rank for previous month

Exhibit 5-2
OUTPATIENT VISITS — COMPARATIVE PERFORMANCE REPORT (GENERAL)

Branch Name

MM/YY Run Date

	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Total	12-Month Average
Polyclinic 1							
Average Daily Visits							
Total Monthly Visits							
Polyclinic 2							
Average Daily Visits							
Total Monthly Visits							
Polyclinic 3							
Average Daily Visits							
Total Monthly Visits							

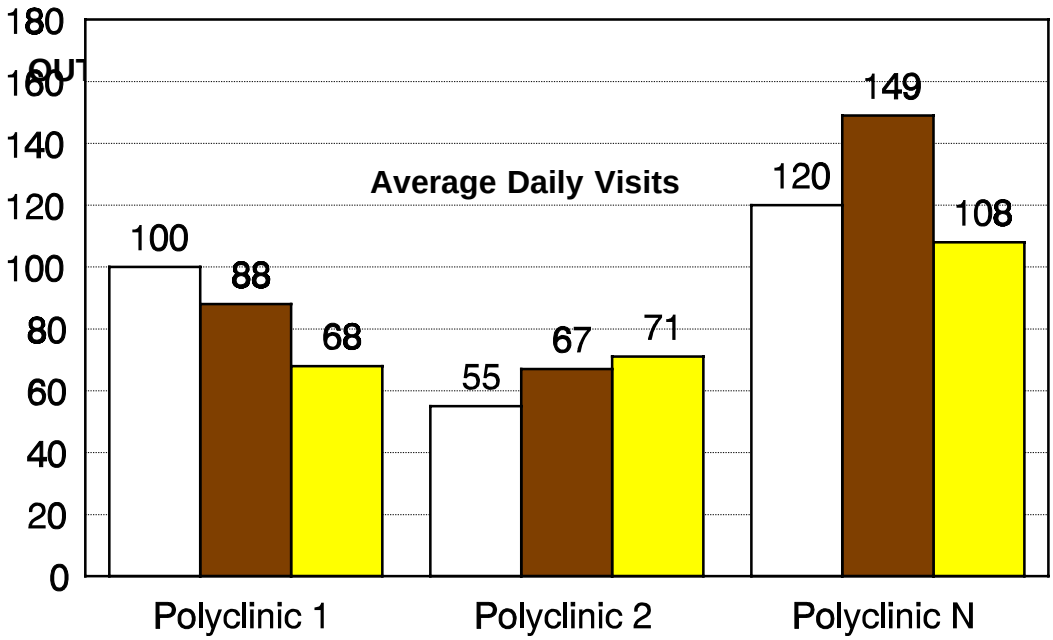


Exhibit 5-4
OUTPATIENT VISITS — RANK ORDER REPORT

Branch Name

Reporting Period Run Date

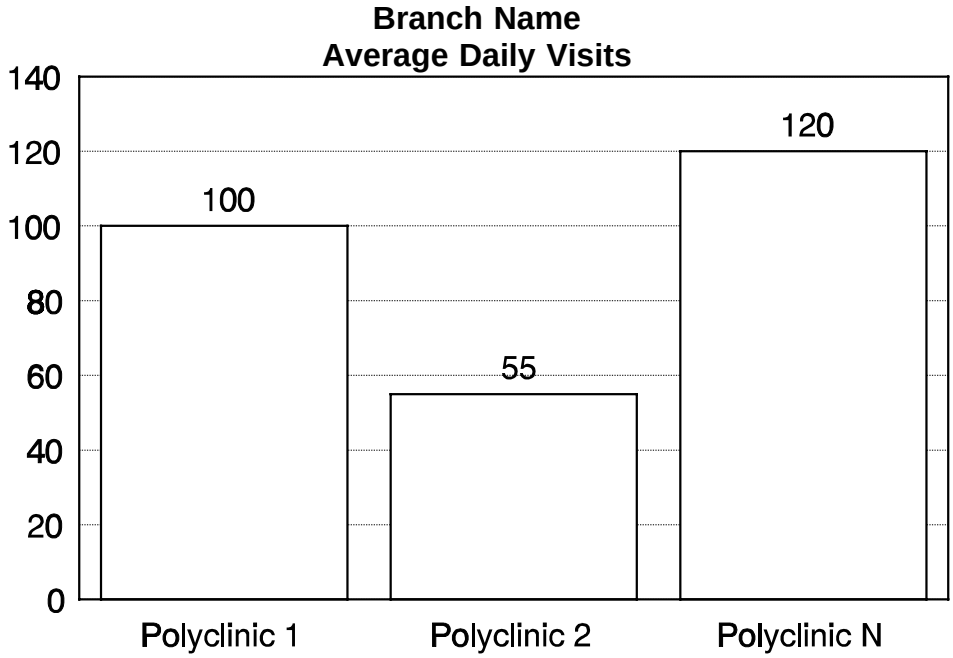
	Polyclinic 1 Value	Polyclinic 1 Rank	Polyclinic 2 Value	Polyclinic 2 Rank	Polyclinic N Value	Polyclinic N Rank	12-Month Total	Monthly Polyclinic Average
Average Number of Daily Visits	Total (a)	(b)	Total (a)	(b)	Total (a)	(b)	Total	
Total Number of Visits	Total	(b)	Total	(b)	Total	(b)	Total	
ICD-9 Code	**Polyclinic 1 Name**	**Polyclinic 1 Value**	**Polyclinic 2 Name**	**Polyclinic 2 Value**	**Polyclinic N Name**	**Polyclinic N Value**		
#1 Ranked ICD-9								
#2 Ranked ICD-9								
#3 Ranked ICD-9								
#4 Ranked ICD-9								
#5 Ranked ICD-9								

Special calculations are required for these values:

(a) A "plus" (+) is noted for any value showing an increase of more than 10% from the previous month. A "minus" (-) is noted for any value showing an decrease of more than 10% from the previous month.

(b) Rank order is assigned based on a sort of the average number of daily visits at each facility. The rank of "1" is assigned for the polyclinic with the greatest number of visits, a rank of "n" is assigned to the polyclinic with the least number of visits.

Exhibit 5-5
OUTPATIENT VISITS — RANK ORDER GRAPH



5.1.3 Outpatient Visits — Trend Report

The Outpatient Visits — Trend Report presents the monthly average number of visits per day and total monthly visits per polyclinic, branch, or for the entire HIO. This report shows the outpatient visit pattern over a 12-month period. This allows managers to view any seasonal differences, as well as any variations between facilities or branches.

The Outpatient Visits — Trend Report, as run for a facility, is presented in Exhibit 5-6. The facility-level report presents the names of the five most common ICD-9 codes for each of the last 12 months. The Outpatient Visits — Trend Report and Graph, as run for the branch and Headquarters levels, do not include ICD-9 information and are presented in Exhibit 5-7 and 5-8, respectively. The graph presents the average visits per day.

5.1.4 Outpatient Visits — Exception Report

An exception report format for the Outpatient Visit Report is not available.

Exhibit 5-6
OUTPATIENT VISITS — TREND REPORT (FACILITY)

Facility Name

Reporting Period Run Date

	Current Month (n)	Month (n-1)	Month (n-2)	Month (n-12)	Total	Average
Average Daily Visits						
Total Monthly Visits						
ICD-9 Code 1 Name						
ICD-9 Code 2 Name						
ICD-9 Code 3 Name						
ICD-9 Code 4 Name						
ICD-9 Code 5 Name						

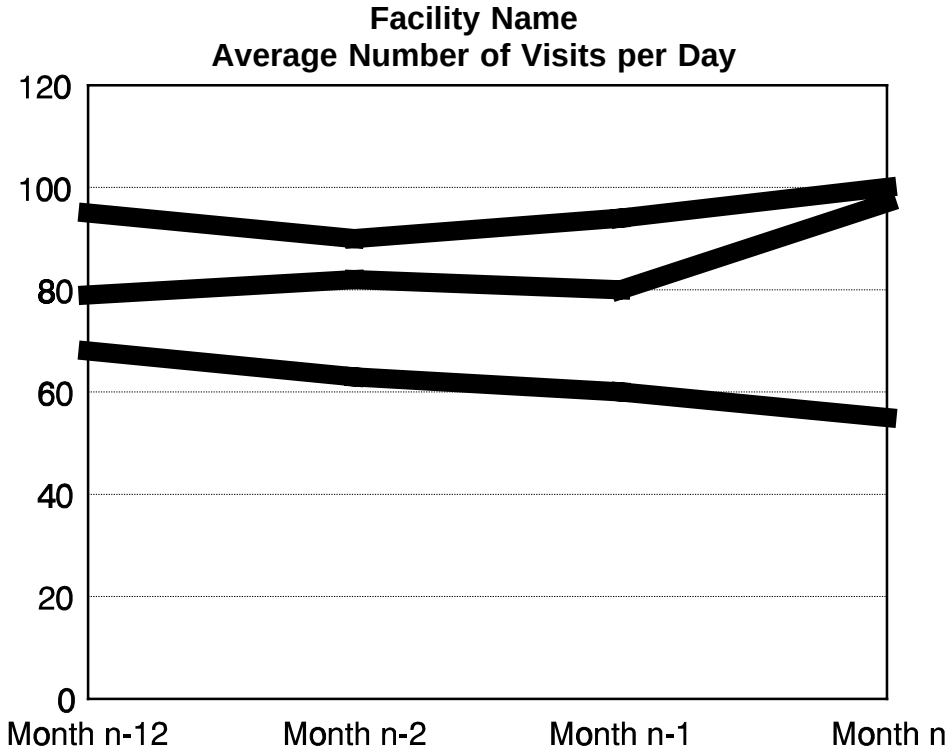
Exhibit 5-7
OUTPATIENT VISITS — TREND REPORT (BRANCH OR HEADQUARTERS)

Branch Name

Reporting Period Run Date

	Current Month (n)	Month (n-1)	Month (n-2)	Month (n-12)	Total	Average
Average Daily Visits						
Polyclinic 1						
Polyclinic 2						
Polyclinic N						
Total Monthly Visits						
Polyclinic 1						
Polyclinic 2						
Polyclinic N						

Exhibit 5-8
OUTPATIENT VISITS — TREND GRAPH



5.2 Occupancy and Length of Stay Rates

The purpose of this report is to provide managers with monthly inpatient occupancy and length of stay (LOS) rates per physical unit in a hospital. Analysis of this information provides guidance on departmental requirements for beds and staff. The following definitions and descriptions pertain to this report:

- The monthly occupancy rate is defined as the total number of occupied bed-days divided by the total number of available bed-days over a given month. An occupied bed-day is one bed occupied for one day. (Three occupied beds in one day is three occupied bed-days. Likewise, one bed occupied for three days is three occupied bed-days.) Monthly occupied bed-days is the sum of occupied bed-days over a given month. Monthly available bed-days is the total number of beds available multiplied by 30 (the average number of days in a month).

  Example:
  A ward has 25 available beds. The total number of available bed-days is 25 x 30, or 750.

  If 50 patients assigned to that ward each occupy a bed for four days (50 x 4 = 200) and 50 patients assigned to the ward each occupy a bed for six days (50 x 6 = 300), the total number of occupied bed-days is 500. The total

occupied bed-days (500) divided by the total available bed days (750) equals the monthly occupancy rate (66.7%).

- The class intervals in the LOS analysis are each filled by first computing the total number of patients in the ward who have a length of stay meeting the class interval specified, where the number of days represents the class interval. Secondly, if there are 100 patients assigned to the ward that month and 15 have a length of stay of one day, then 15/100 or 15% of the patients have a length of stay of one day.

- Available beds consists of all beds in the ward including occupied, vacant, "reserved," and any other beds assigned to that ward.

- The admissions date included in the report is taken from n-2 (where n is the current month) because this report is based on admissions which may occur at any point during the month and the length of stay may extend to the next month. Therefore, if the report is generated for March 1996, the admissions count is for January 1996. This allows the length of stay data to be calculated for at least 30 days following the admission date.

5.2.1 Occupancy and Length of Stay — Comparative Performance Report

The Occupancy and Length of Stay — Comparative Performance Report is divided into two sections: LOS and occupancy rate. When run for a hospital, the report presents values by ward. When run for a branch, the report presents values by hospital. When run for the entire HIO, the report presents values by branch. Values are presented for the reporting month without comparison to previous months, as is consistent with the comparative performance report format.

The LOS section of the report presents the following values:

- number of admissions,
- percentage of LOS for one or less day,
- percentage of LOS for two days,
- percentage of LOS for three days,
- percentage of LOS for four days,
- percentage of LOS for five days,
- percentage of LOS for six days,

- percentage of LOS for seven to ten days, and
- percentage of LOS for more than ten days.

The occupancy rate section uses the standard format and presents the following values:

- number of beds available,
- number of beds filled,
- number of beds vacant, and
- monthly occupancy.

This report allows managers to become aware of bed usage and requirements. A ward or hospital which has a low occupancy rate can be investigated by the manager, and reasons for the low rate can be determined and acted upon. The graph associated with this report shows the average monthly occupancy rates only. The Length of Stay and Occupancy Rates — Comparative Performance Report and Graph as run for a hospital are presented in Exhibits 5-9 and 5-10, respectively.

5.2.2 Occupancy and Length of Stay — Rank Order Report

The rank order format for the Occupancy and Length of Stay Report presents the average length of stay and average daily occupancy rate for a ward, hospital, branch, or for the entire HIO, as specified when the report is run. When producing the report at a ward level, the report notes with a plus (+) or minus (-) the wards which have had a greater than ten percent positive change in value (+) or negative change in value (-) from values for the last month.

This report allows managers to monitor hospitals with lower than average occupancy rates or lengths of stay and to recommend procedural changes to alter these values accordingly. The Occupancy and Length of Stay — Rank Order Report and Graph, as generated for a hospital, are presented in Exhibits 5-11 and 5-12, respectively.

5.2.3 Occupancy and Length of Stay — Trend Report

The Occupancy and Length of Stay — Trend Report presents the average length of stay rate and average daily occupancy rate per month for a ward, hospital, branch, or the HIO, as specified when the report is run. This report shows the inpatient utilization statistics over a 12-month period. This allows managers to view any seasonal differences or variations between facilities or branches. The Occupancy and Length of Stay — Trend Report and Graph, as generated for a hospital, are presented in Exhibits 5-13 and 5-14, respectively.

Exhibit 5-9
OCCUPANCY AND LENGTH OF STAY RATES — COMPARATIVE PERFORMANCE REPORT

Hospital Name

MM/YY **Length of Stay** Run Date

	<1 day	2 days	3 days	4 days	5 days	6 days	7-10 days	Average LOS
Ward 1								
Ward 2								
Ward N								
	Total	Total	Total	Total	Total	Total	Total	Average

MM/YY **Occupancy Rates** Run Date

	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Total	12-Month Average
Ward 1							
# Beds Available			(a)		(b)		
# Beds Filled			(a)		(b)		
# Beds Vacant			(a)		(b)		
Monthly Occupancy Rate			(a)		(b)		
Ward 2							
# Beds Available			(a)		(b)		
# Beds Filled			(a)		(b)		
# Beds Vacant			(a)		(b)		
Monthly Occupancy Rate			(a)		(b)		
Ward N							
# Beds Available			(a)		(b)		
# Beds Filled			(a)		(b)		
# Beds Vacant			(a)		(b)		
Monthly Occupancy Rate			(a)		(b)		

Special calculations are required for these fields:

(a) **% Change in Occupancy Rate from Last Month** =

$$\frac{\text{Current Month Avg. Occ. Rate - Last Month Avg. Occ. Rate}}{\text{Current Month Avg. Occ. Rate}} * 100$$

(b) **% Change in Occupancy Rate from Last Month** =

$$\text{Rate} = \frac{\text{Current Month Avg. Occ. Rate - Same Month Last Yr. Avg. Occ. Rate}}{\text{Current Month Avg. Occ. Rate}} * 100$$

Exhibit 5-10
OCCUPANCY RATES — COMPARATIVE PERFORMANCE GRAPH

Hospital Name

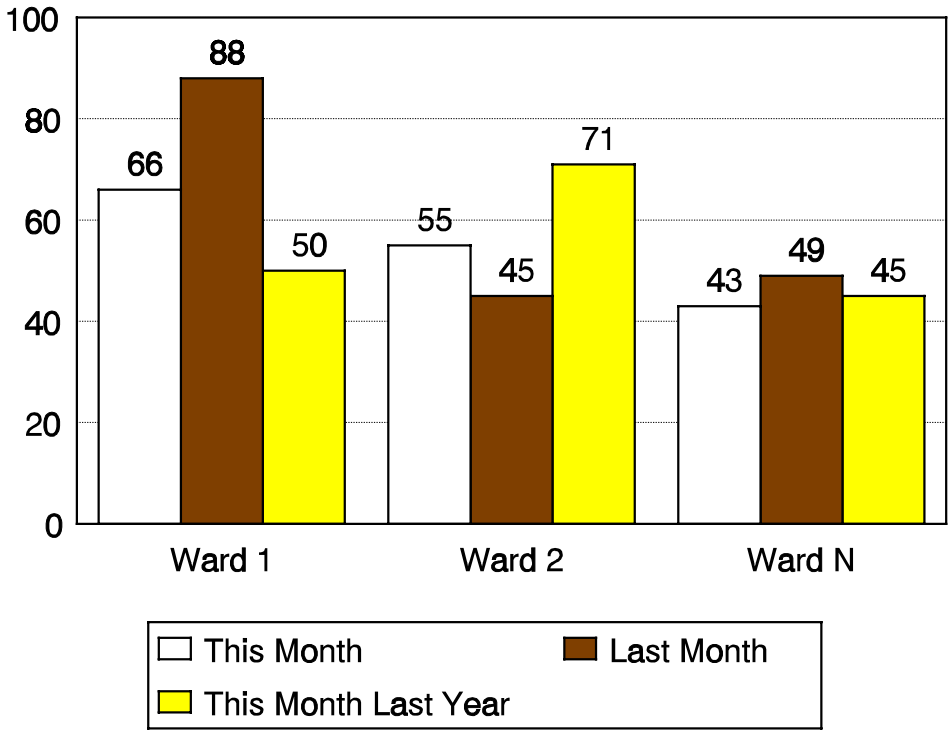


Exhibit 5-11
OCCUPANCY RATE AND LENGTH OF STAY — RANK ORDER REPORT

Hospital Name

Reporting Period Run Date

	Ward 1 Value	Ward 1 Rank	Ward 2 Value	Ward 2 Rank	Ward N Value	Ward N Rank	12-Month Total	Monthly Ward Average
Average Length of Stay	(a)	(b)	(a)	(b)	(a)	(b)		
Average Daily Occupancy Rate	(a)	(b)	(a)	(b)	(a)	(b)		

Special calculations are required for these values:

(a) A "plus" (+) is noted for any value showing an increase of more than 10% from the previous month. A "minus" (-) is noted for any value showing an decrease of more than 10% from the previous month.

(b) Rank order is assigned based on a sort of the total number of visits to each facility. The rank of "1" is assigned to the lowest average length of stay and daily occupancy rate.

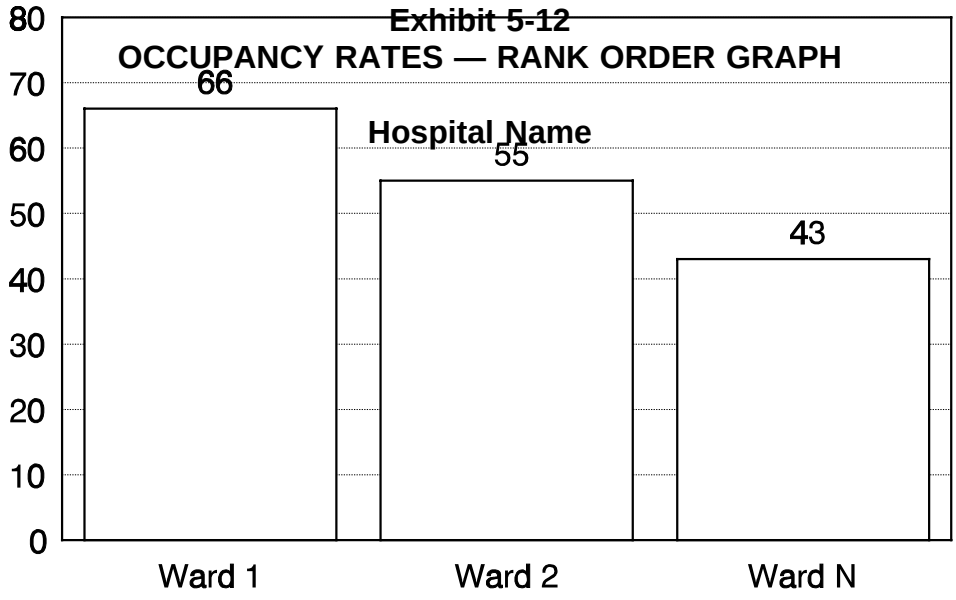


Exhibit 5-13
OCCUPANCY AND LENGTH OF STAY — TREND REPORT

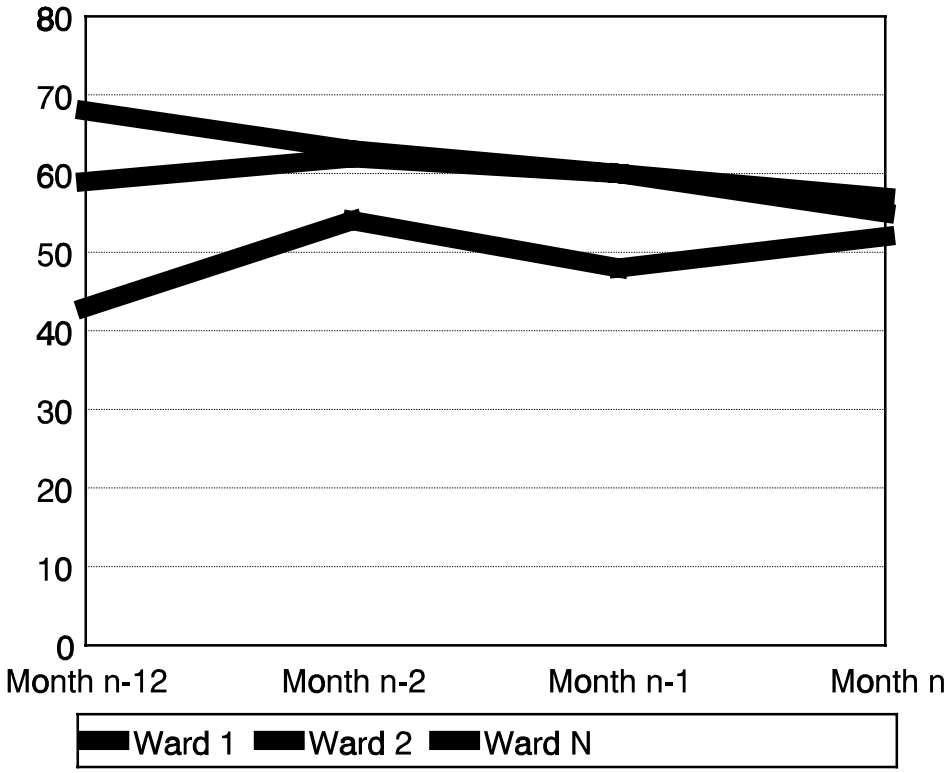
Hospital Name

Reporting Period Run Date

	Current Month (n)	Month (n-1)	Month (n-2)	Month (n-12)	Average
Average Length of Stay					
Ward 1					
Ward 2					
Ward N					
Average Daily Occupancy Rate					
Ward 1					
Ward 2					
Ward N					

Exhibit 5-14
OCCUPANCY RATES — TREND GRAPH

Hospital Name



5.2.4 Length of Stay — Exception Report

The Length of Stay — Exception Report displays the Case ID and beneficiary name for one case per ward representing a length of stay exceeding ten days. The exception report also presents the total count of cases per ward where the length of stay exceeds ten days. The report is available at hospitals only. The report provides a list of specific cases of long lengths of stay to target for investigation. The Length of Stay — Exception Report is presented in Exhibit 5-15.

Exhibit 5-15
LENGTH OF STAY — EXCEPTION REPORT

Hospital Name

Reporting Month Run Date

	Case ID	Beneficiary Name	Length of Stay	Total Population
Ward 1	Case ID			
Ward 2	Case ID			
Ward N	Case ID			

5.3 Discharge Profiles

This report displays discharge profiles by discharge ICD-9 code, hospital, branch, and HIO, as specified when the report is run. The ICD-9 codes specified are the ones targeted by the HIO for hospital quality assurance efforts. Specific information presented is the discharge count, procedures per discharge, and prescriptions per discharge. These are indicators for cost of care, and service and resource utilization.

The 30 targeted ICD-9 codes are:

- Ill-defined Intestinal Infections (009),
- Viral Hepatitis (070),
- Diabetes Mellitus (250),
- Hereditary Hemolytic Anemias (282),
- Schizophrenic Psychoses (295),
- Cataract (366),
- Essential Hypertension (401),

- Acute Myocardial Infarction (410),
- Hemorrhoids (455),
- Acute Upper Respiratory Infections of Multiple or Unspecified Sites (465),
- Acute Bronchitis and Bronchiolitis (466),
- Chronic Disease of Tonsils and Adenoids (474),
- Bronchopneumonia, Organism Unspecified (485),
- Asthma (493),
- Inguinal Hernia (550),
- Other Noninfective Gastroenteritis and Colitis (558),
- Anal Fissure and Fistula (565),
- Cholelithiasis (574),
- Chronic Renal Failure (585),
- Calculus of Kidney and Ureter (592),
- Disorders of Menstruation and Other Abnormal Bleeding from Female Genital Tract (626),
- Infertility, Female (628),
- Spontaneous Abortion (634),
- Hemorrhage in Early Pregnancy (640),
- Excessive Vomiting in Pregnancy (643),
- Delivery in a Completely Normal Case (650),
- Other Complications of Labor and Delivery (669),
- Disorders Relating to Short Gestation and Unspecified Low Birth Weight (765), and
- General Symptoms (Coma and Stupor) (780).

5.3.1 Discharge Profiles — Comparative Performance Report

The comparative performance report for discharge profiles displays the following values for each ICD-9 code:

- o discharge count,
- o number of prescriptions per discharge, and
- o number of procedures per discharge.

This report allows managers to compare and analyze indicators of cost of care for the most common diagnoses (ICD-9) at the HIO. The Discharge Profiles — Comparative Performance Report and Graphs, as run for a hospital, are presented in Exhibits 5-16 and 5-17, respectively.

Exhibit 5-16
DISCHARGE PROFILES — COMPARATIVE PERFORMANCE REPORT

Hospital Name

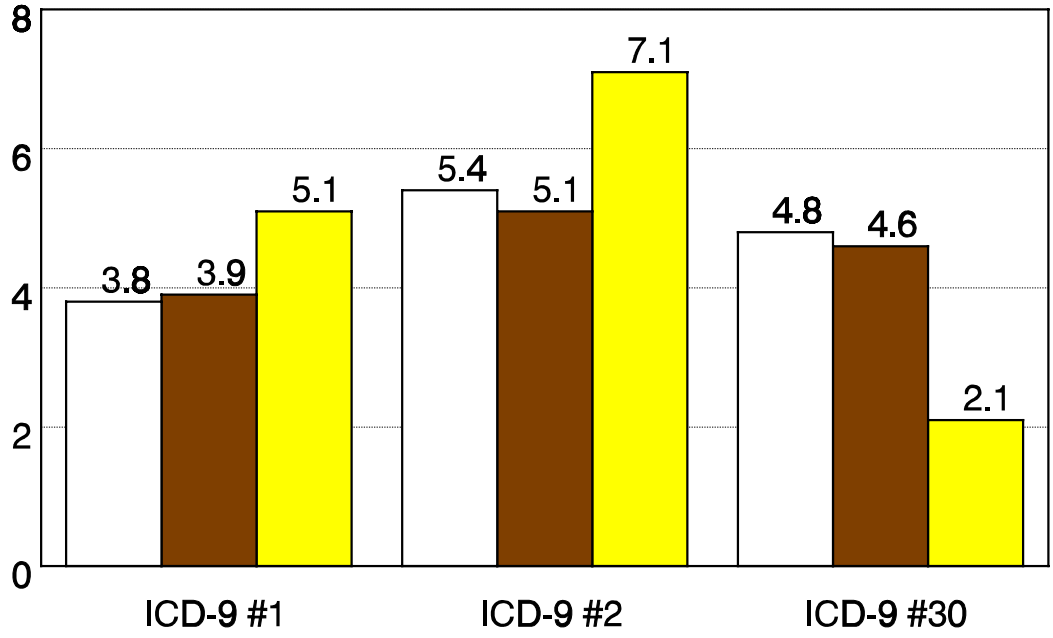
MM/YY Run Date

	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Total	12-Month Average
ICD-9 #1							
Discharge Count							
Rxs/Discharge							
Procs/Discharge							
ICD-9 #2							
Discharge Count							
Rxs/Discharge							
Procs/Discharge							
ICD-9 #30							
Discharge Count							
Rxs/Discharge							
Procs/Discharge							

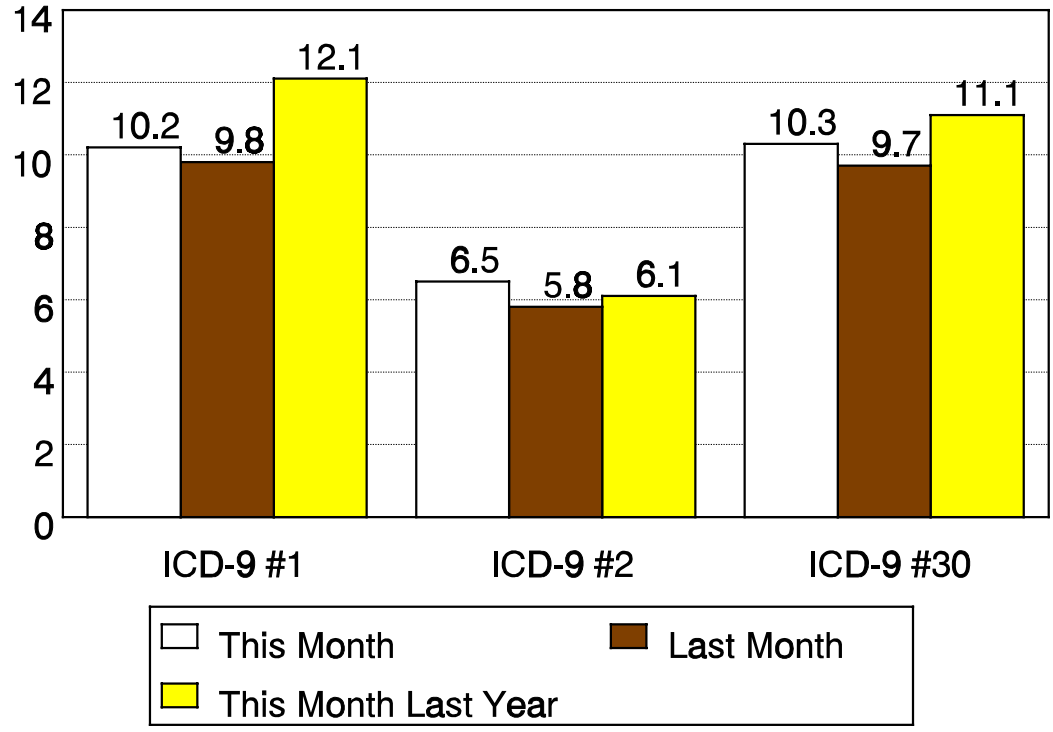
Exhibit 5-17
DISCHARGE PROFILES — COMPARATIVE PERFORMANCE GRAPHS

Hospital Name

Prescription Rates



Procedure Rates



5.3.2 Discharge Profiles — Rank Order Report

The rank order report for discharge profiles presents the rank orders for the targeted ICD-9 codes at a hospital, hospitals in a branch, or branches in the HIO. It shows prescriptions per discharge and procedures per discharge. Analysis of this report provides hospital managers with a knowledge of the utilization of prescriptions and procedures for the most common ICD-9 codes. The Discharge Profiles — Rank Order Report and Graphs, as run for a hospital, are presented in Exhibits 5-18 and 5-19, respectively.

Exhibit 5-18
DISCHARGE PROFILES — RANK ORDER REPORT

Hospital Name

Reporting Period Run Date

	ICD-9 #1 Value	ICD-9 #1 Rank	ICD-9 #2 Value	ICD-9 #2 Rank	ICD-9 N Value	ICD-9 N Rank	12-Month Total	Monthly ICD-9 Average
Discharge Count	(a)	(b)	(a)	(b)	(a)	(b)		
Rxs Per Discharge	(a)	(b)	(a)	(b)	(a)	(b)		
Procedures per Discharge	(a)	(b)	(a)	(b)	(a)	(b)		

Special calculations are required for these values:

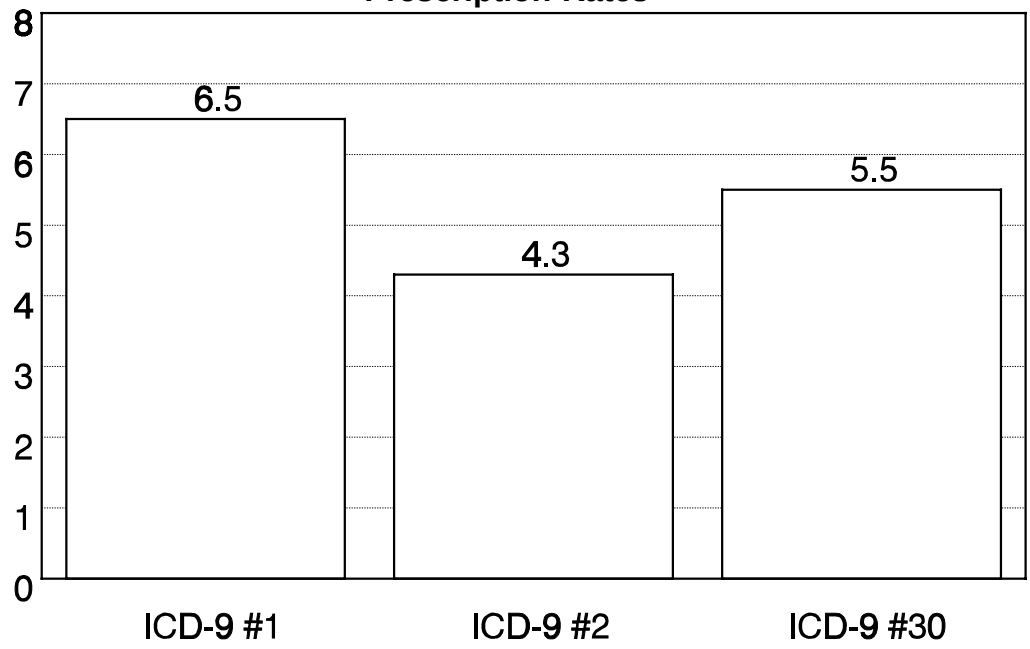
(a) A "plus" (+) is noted for any value showing an increase of more than 10% from the previous month. A "minus" (-) is noted for any value showing an decrease of more than 10% from the previous month.

(b) Rank order is presented for the discharge count, prescriptions per discharge, and procedures per discharge. The rank of "1" is assigned to the greatest number of discharges, as well as to the lowest rate of prescriptions per discharge and procedures per discharge.

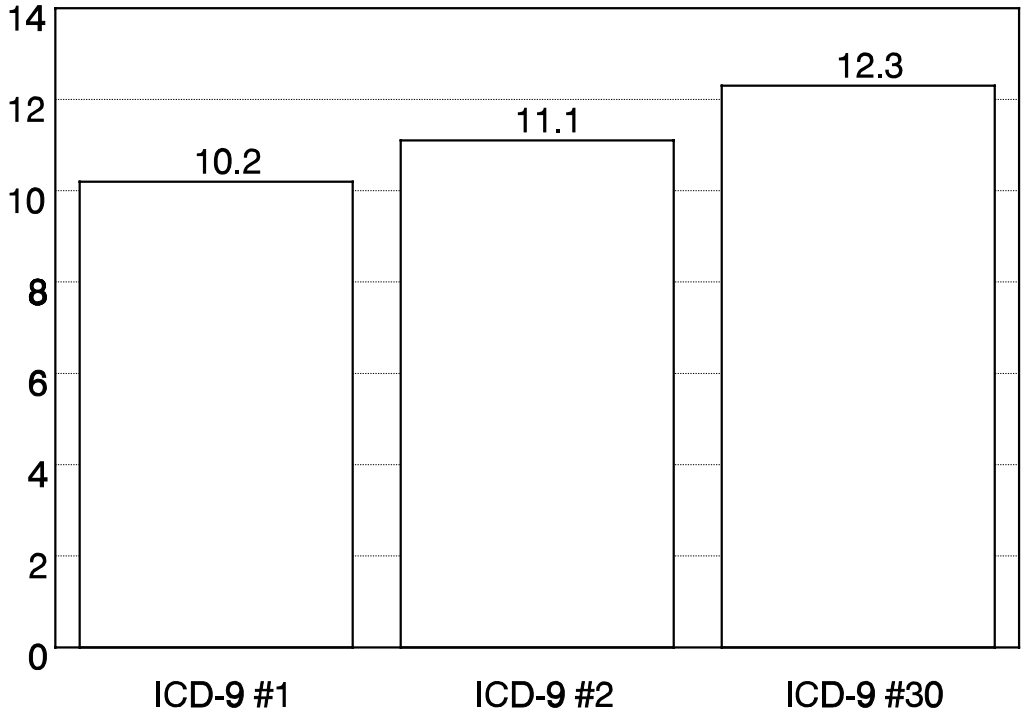
Exhibit 5-19
DISCHARGE PROFILES — RANK ORDER GRAPHS

Hospital Name

Prescription Rates



Procedures per Discharge



5.3.3 Discharge Profiles — Trend Report

The trend report for discharge profiles shows the trends for discharge count, prescriptions per discharge, and procedures per discharge aggregated by ICD-9 codes, hospitals, branches, and the HIO, as specified at run time. Analysis of this report shows managers the trends for these indicators over a 12-month period. A line graph illustrating trends is also available for this report. The Discharge Profiles — Rank Order Report and Graphs, as run for a hospital, are presented in Exhibits 5-20 and 5-21, respectively.

Exhibit 5-20
DISCHARGE PROFILES — TREND REPORT

Hospital Name

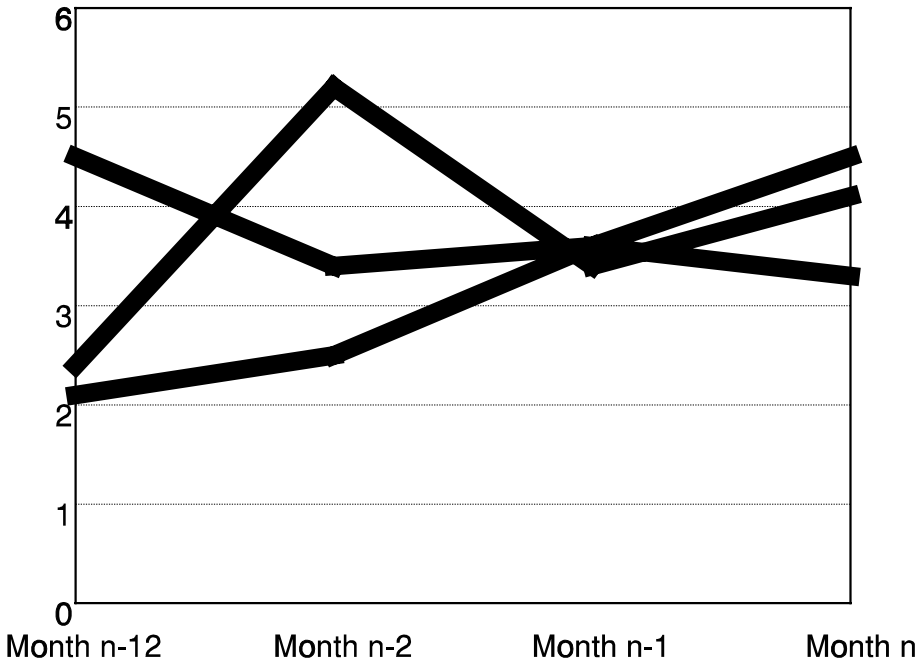
Reporting Period — Run Date

	Current Month (n)	Month (n-1)	Month (n-2)	Month (n-12)	Total	Average
Discharge Count						
ICD-9 #1						
ICD-9 #2						
ICD-9 N						
Prescriptions per Discharge						
ICD-9 #1						
ICD-9 #2						
ICD-9 N						
Procedures per Discharge						
ICD-9 #1						
ICD-9 #2						
ICD-9 N						

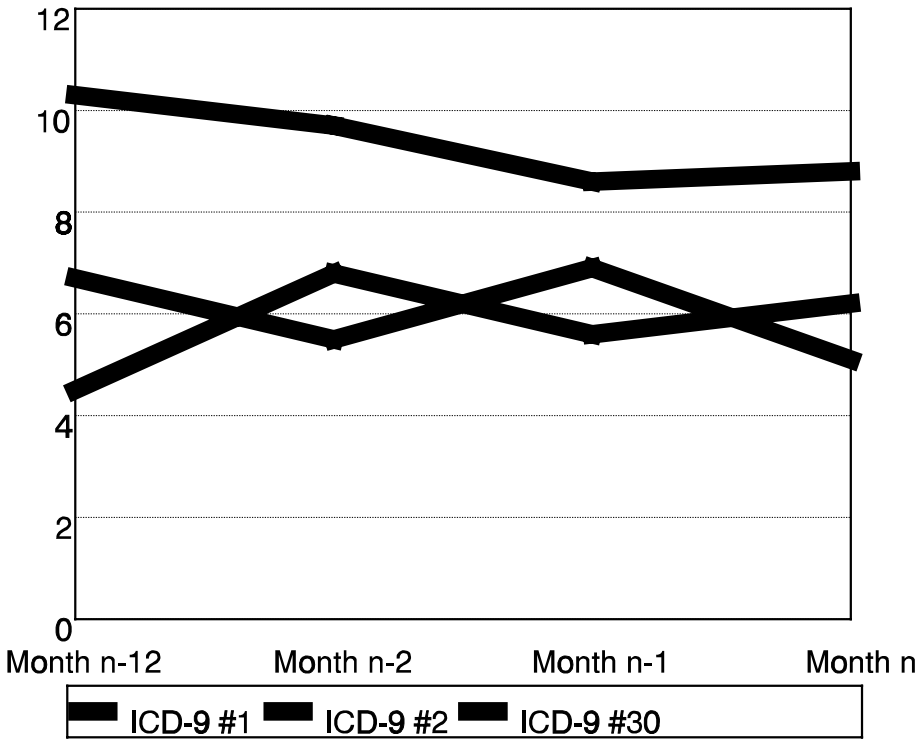
Exhibit 5-21
DISCHARGE PROFILES — TREND GRAPHS

Hospital Name

Prescription Rates



Procedure Rates



5.3.4 Discharge Profiles — Exception Report

An exception report for discharge profiles is not available.

5.4 Contracted Services Report

This report presents information on both referrals and prescriptions provided by contracted providers. Service provision by contracted providers is a high cost incurred by the HIO. The rate of these services must be monitored by HIO management, both for controlling costs and for recognizing what additional services are needed in the HIO. A specialty having a high number of referrals to contracted services can be investigated to determine if one physician is responsible for most of the referrals, or if a needed service is not available and offered only by a contracted provider. The rate of noncontracted services can be computed from these indicators, if desired.

The report presents these data summarized by specialty in a polyclinic. Two assumption pertains to this report:

- The total number of services provided is determined by the number of procedures recorded in the Patient Records Module.
- Prescriptions that are written but not filled are presumed to be filled by a contracted pharmacy. These events are normally unreported in the HIO MIS. (Further analysis is necessary to ascertain whether or not this is possible.)

5.4.1 Contracted Services — Comparative Performance Report

The comparative performance format for the Contracted Services Report presents the following values for each specialty:

- number of services provided,
- percentage of contracted service referrals,
- number of prescriptions written, and
- percentage of unfilled prescriptions.

The Contracted Services — Comparative Performance Report and Graphs, as run for a facility, are shown in Exhibits 5-22 and 5-23, respectively.

Exhibit 5-22
CONTRACTED SERVICES — COMPARATIVE PERFORMANCE REPORT

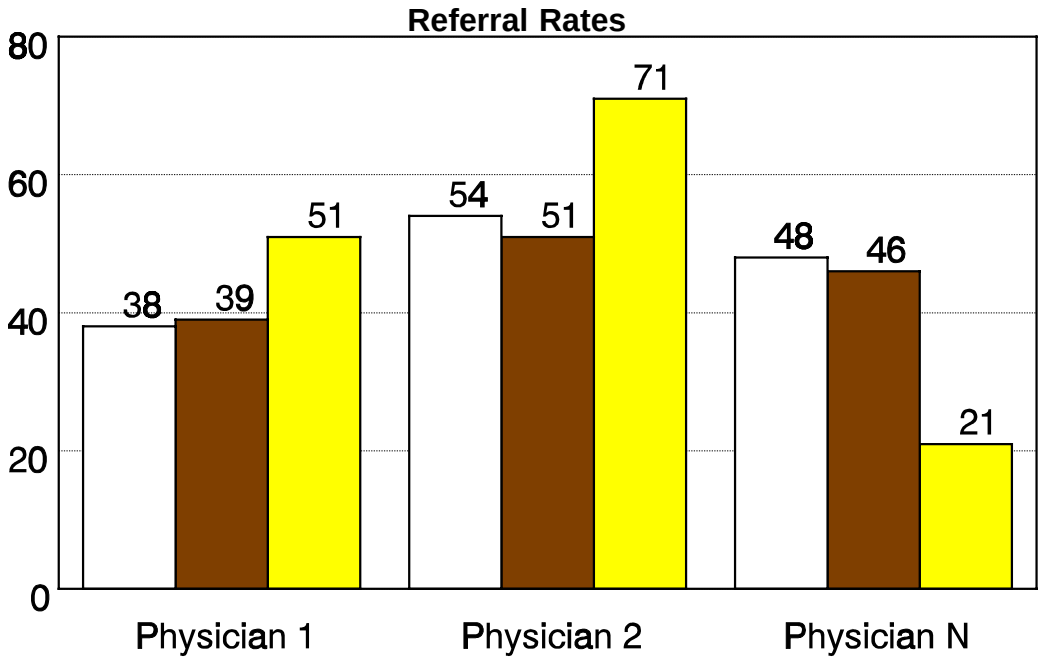
Polyclinic Name

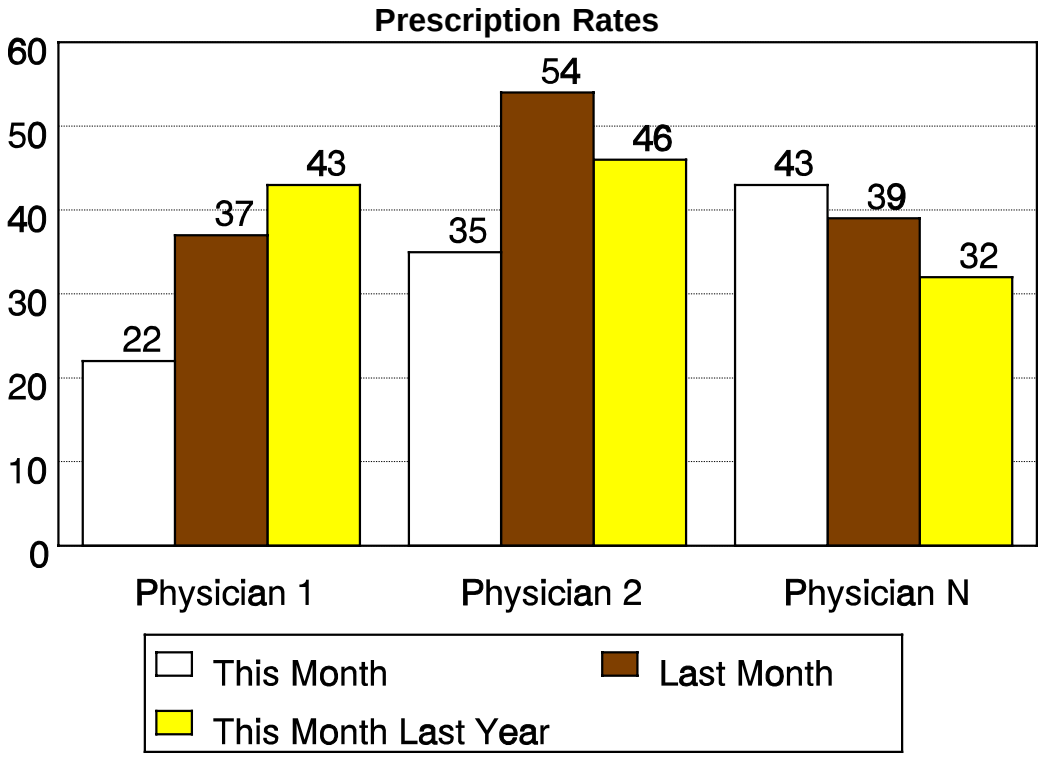
MM/YY Run Date

	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Total	12-Month Average
Specialty 1							
Total Number of Services Provided							
Rate of Contracted Service Referrals							
Total Number of Prescriptions Written							
Rate of Unfilled Prescriptions							
Specialty 2							
Total Number of Services Provided							
Rate of Contracted Service Referrals							
Total Number of Prescriptions Written							
Rate of Unfilled Prescriptions							
Specialty N							
Total Number of Services Provided							
Rate of Contracted Service Referrals							
Total Number of Prescriptions Written							
Rate of Unfilled Prescriptions							

Exhibit 5-23
CONTRACTED SERVICES — COMPARATIVE PERFORMANCE GRAPHS

Polyclinic Name





5.4.2 Contracted Services — Rank Order Report

The rank order format for the Contracted Services Report is used to rank order specialties, facilities, and branches based on the indicators of cost and utilization. The Contracted Services — Rank Order Report and Graphs, as run for a polyclinic, are presented in Exhibits 5-24 and 5-25, respectively.

Exhibit 5-24
CONTRACTED SERVICES — RANK ORDER REPORT

Polyclinic Name

Reporting Period Run Date

	Specialty 1 Value	Specialty 1 Rank	Specialty 2 Value	Specialty 2 Rank	Specialty N Value	Specialty N Rank	12-Month Total	Monthly Specialty Average
Total Number of Services Provided	(a)	(b)	(a)	(b)	(a)	(b)		
Rate of Contracted Service Referrals	(a)	(b)	(a)	(b)	(a)	(b)		
Total Number of Prescriptions Written	(a)	(b)	(a)	(b)	(a)	(b)		
Rate of Unfilled Prescriptions	(a)	(b)	(a)	(b)	(a)	(b)		

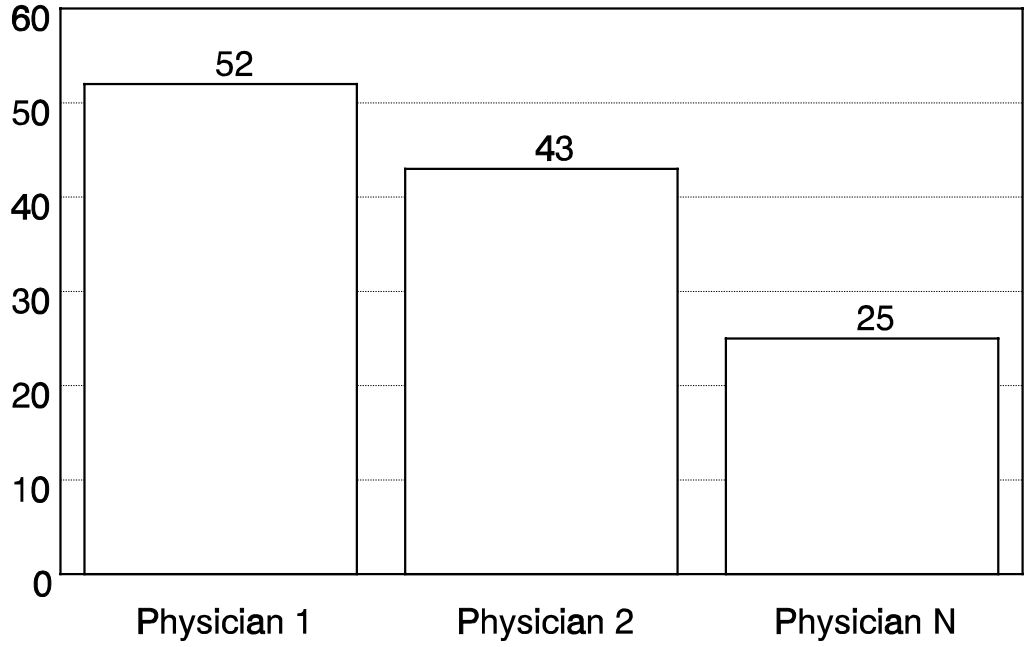
(a) A "plus" (+) is noted for any value showing an increase of more than 10% from the previous month. A "minus" (-) is noted for any value showing an decrease of more than 10% from the previous month.

(b) Rank order is assigned for each category on the report. The rank of "1" is assigned for the greatest rate. The rank of "n" is assigned to the lowest rate.

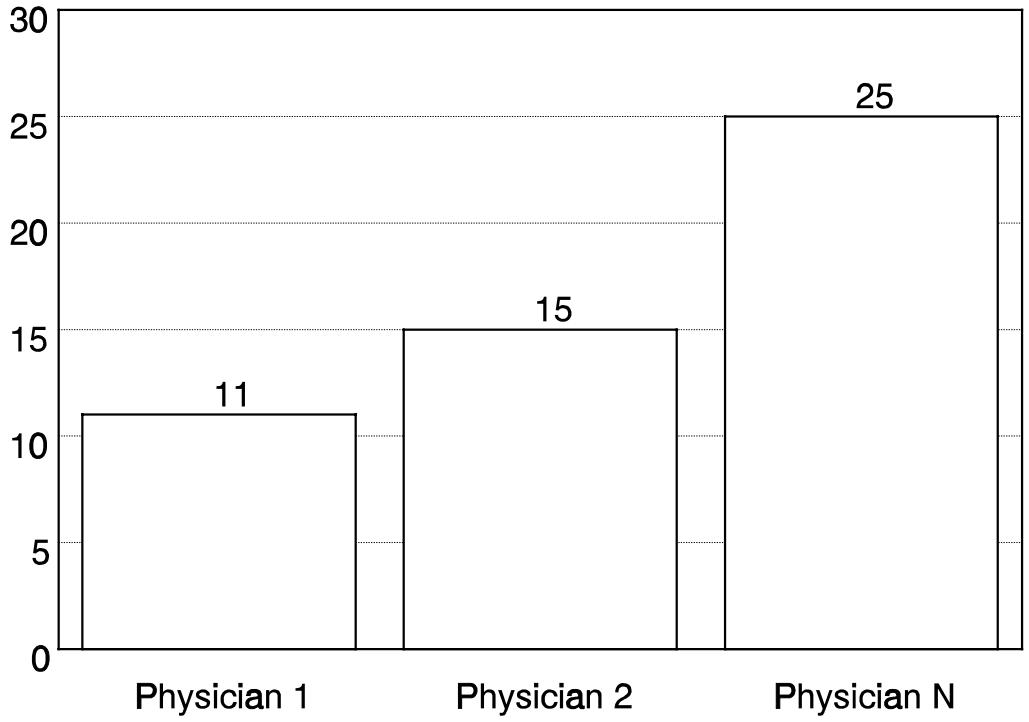
Exhibit 5-25
CONTRACTED SERVICES — RANK ORDER GRAPHS

Polyclinic Name

Referral Rates



Prescription Rates



5.4.3 Contracted Services — Trend Report

The trend format for the Contracted Services Report indicates the effects of policy and procedural changes adopted to control the use of contracted services. When the report is run for a polyclinic, the facility manager can view the result of policy changes regulating the use of contracted services. The Contracted Services — Trend Report and Graphs are presented in Exhibits 5-26 and 5-27, respectively.

Exhibit 5-26
CONTRACTED SERVICES — TREND REPORT

Polyclinic Name

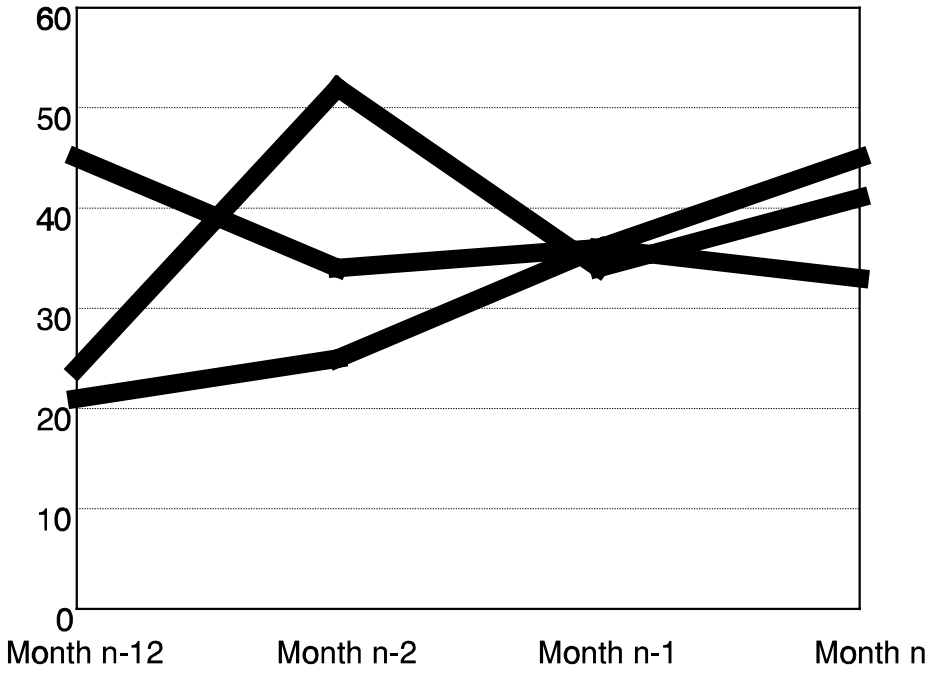
Reporting Period Run Date

	Current Month (n)	Month (n-1)	Month (n-2)	Month (n-12)	Total	Average
Total Number of Services Provided						
Specialty 1						
Specialty 2						
Specialty N						
Rate of Contracted Service Referrals						
Specialty 1						
Specialty 2						
Specialty N						
Total Number of Prescriptions Written						
Specialty 1						
Specialty 2						
Specialty N						
Rate of Unfilled Prescriptions						
Specialty 1						
Specialty 2						
Specialty N						

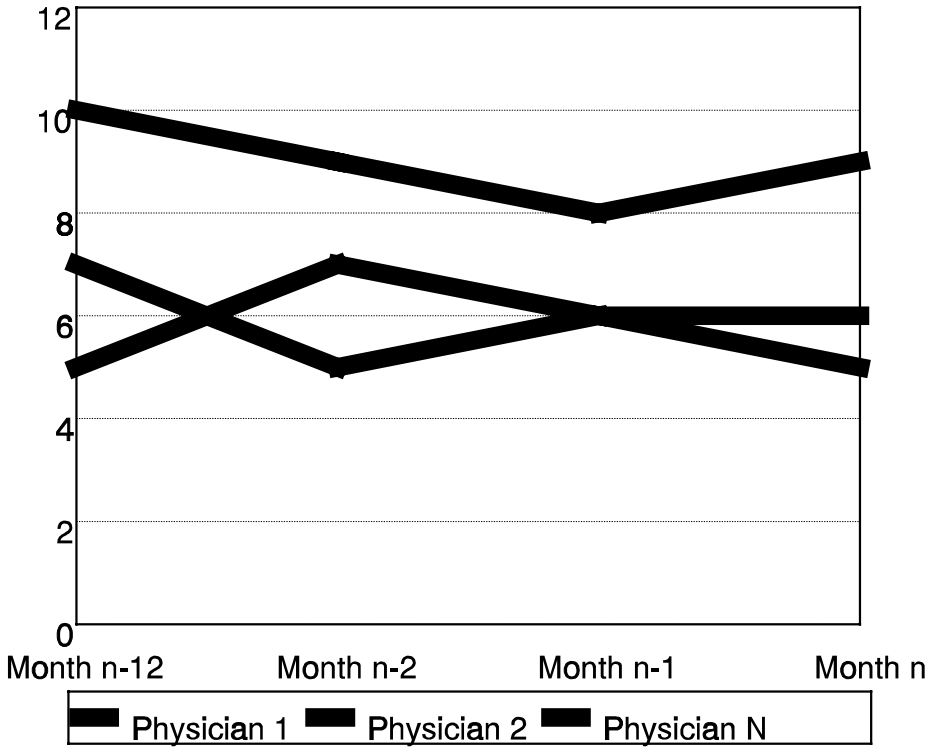
Exhibit 5-27
CONTRACTED SERVICES — TREND GRAPHS

Polyclinic Name

Referral Rates



Prescription Rates



5.4.4 Contracted Services — Exception Report

The exception format for the Contracted Services Report presents the name of one case for each specialty with the highest rate of contracted service referrals and highest rate of unfilled prescriptions. The Contracted Services — Exception Report is presented in Exhibit 5-28.

Exhibit 5-28
CONTRACTED SERVICES — EXCEPTION REPORT

Facility Name

Reporting Month Run Date

Case ID	Beneficiary Name	Physician Name	Total Population
Contracted Service Referrals			
Case ID 1		Specialty 1	
Case ID 2		Specialty 2	
Case ID 10		Specialty N	
Unfilled Prescriptions			
Case ID 1		Specialty 1	
Case ID 2		Specialty 2	
Case ID 10		Specialty 10	

5.5 Staff Utilization Report

This report presents data for polyclinic visits or hospital discharges compared to the number of physicians available at that facility. This report shows the specialties in greatest demand and the number of specialists available at the facility to meet the need. This information allows management to reassign specialists to facilities based on an indicated need. This report is available for both inpatient and outpatient facilities. The single assumption guiding the report is that any physician having at least one unit of service during a month is included on this report.

5.5.1 Staff Utilization — Comparative Performance Report

The comparative performance format for the Staff Utilization Report presents staffing utilization data for the facility, branch, or HIO. At the facility level, the report aggregates information based on the specialties available at the polyclinic or hospital. At the branch, the report aggregates information by facilities. At Headquarters, the report aggregates information by branch. Both the branch and Headquarters can request aggregate data for specialties. A Staff Utilization Comparative Performance Report for a polyclinic is presented in Exhibit 5-

29. Exhibits 5-30 and 5-31 present the Staff Utilization Comparative Performance Report and Graphs, as run for a branch.

Exhibit 5-29
STAFF UTILIZATION — COMPARATIVE PERFORMANCE REPORT (POLYCLINIC)

Polyclinic Name

MM/YY Run Date

	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Total	12-Month Average
Specialty 1							
Physicians							
Visits per Physician							
Specialty 2							
Physicians							
Visits per Physician							
Specialty N							
Physicians							
Visits per Physician							

Exhibit 5-30
STAFF UTILIZATION — COMPARATIVE PERFORMANCE REPORT (BRANCH)

Branch Name

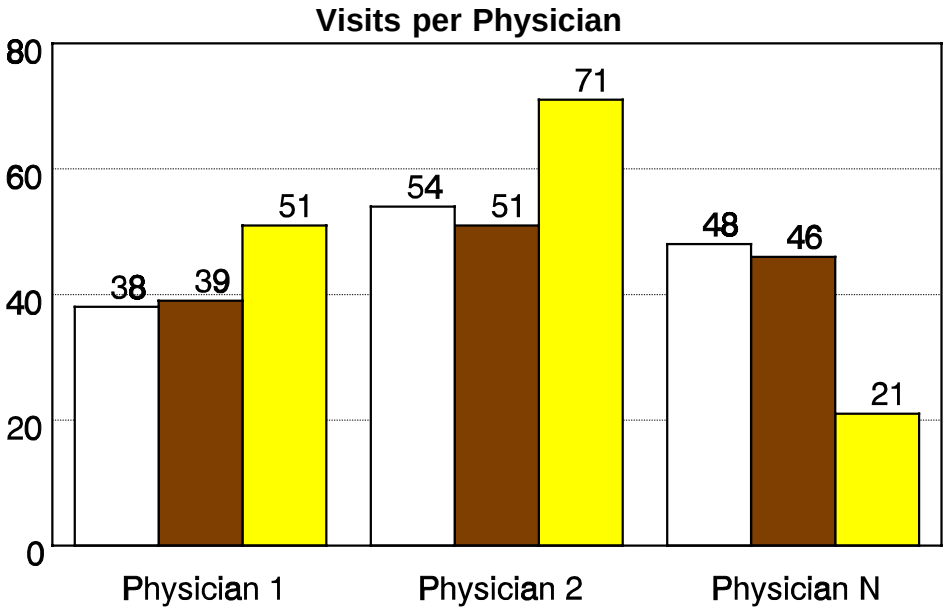
MM/YY Run Date

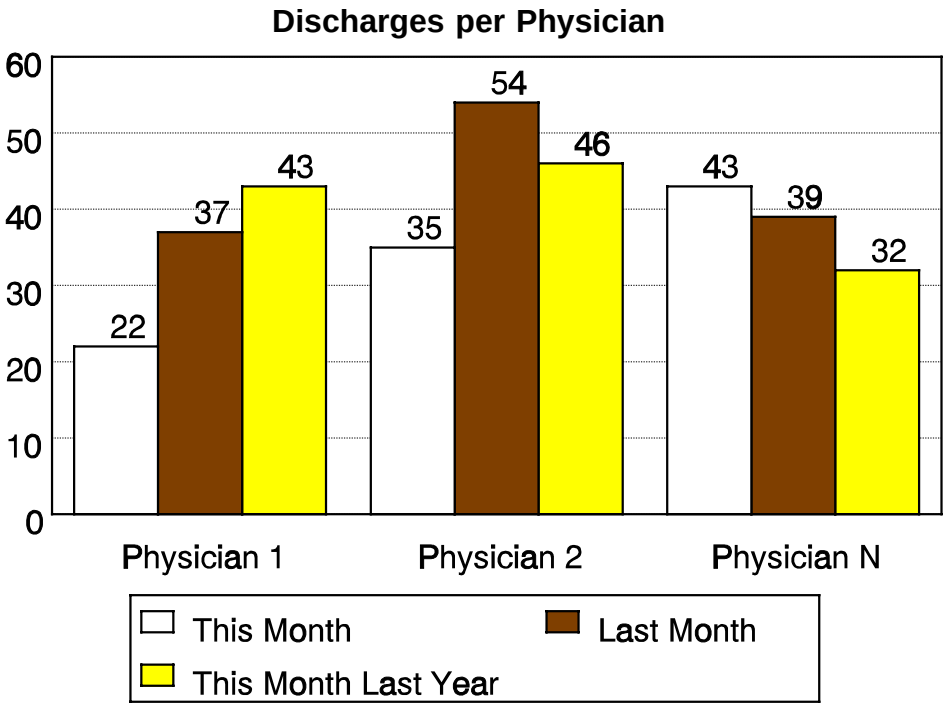
	Last Month	Current Month	% Change from Last Month	Current Month Last Year	% Change from Last Year	12-Month Total	12-Month Average
Specialty 1							
Physicians							
Visits per Physician							
Discharges per Physician							
Specialty 2							
Physicians							

Visit per Physician							
Discharges per Physician							
Specialty N							
Physicians							
Visits per Physician							
Discharges per Physician							

Exhibit 5-31
STAFF UTILIZATION — COMPARATIVE PERFORMANCE GRAPHS

Branch Name





5.5.2 Staff Utilization — Rank Order Report

This report presents the rank order by specialty, facility, or branch, as specified. In a facility, the rank order of specialties is presented. In a branch, the aggregation can be specified either for specialties or facilities. At Headquarters, the rank order can be specified by specialty, facility, or branch. This report allows managers to monitor the staffing by specialty requirements of HIO facilities. Review of this report allows branch managers to assign staff to facilities based on need. The Staff Utilization — Rank Order Report and Graphs, as run for a branch, are presented in Exhibits 5-32 and 5-33, respectively.

Exhibit 5-32
STAFF UTILIZATION — RANK ORDER REPORT

Branch Name

MM/YY Run Date

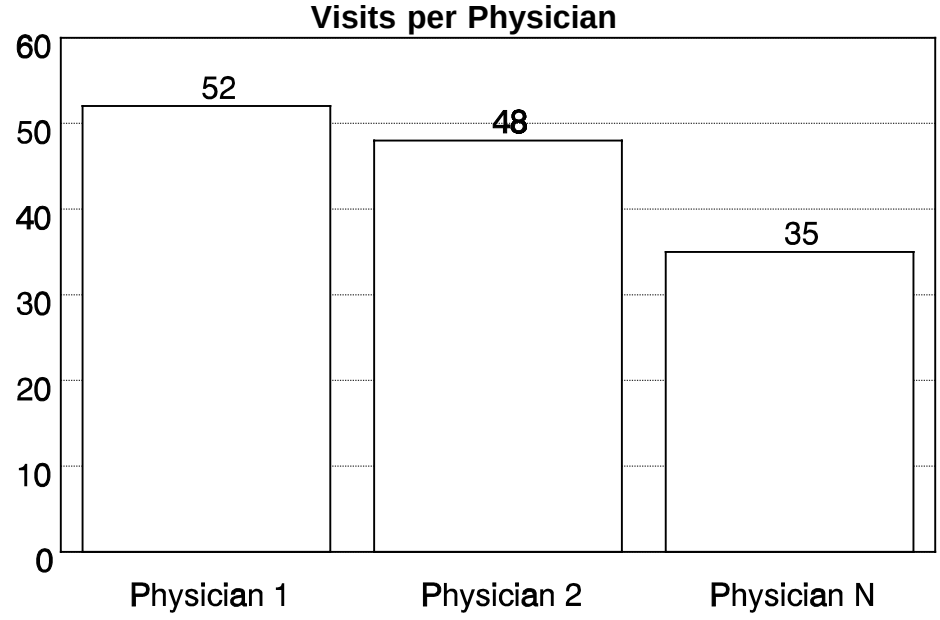
	Specialty 1 Value	Specialty 1 Rank	Specialty 2 Value	Specialty 2 Rank	Specialty N Value	Specialty N Rank	12-Month Total	Specialty Monthly Average
Physicians	(a)	(b)	(a)	(b)	(a)	(b)		
Visits per Physician	(a)	(b)	(a)	(b)	(a)	(b)		
Discharges per Physician	(a)	(b)	(a)	(b)	(a)	(b)		

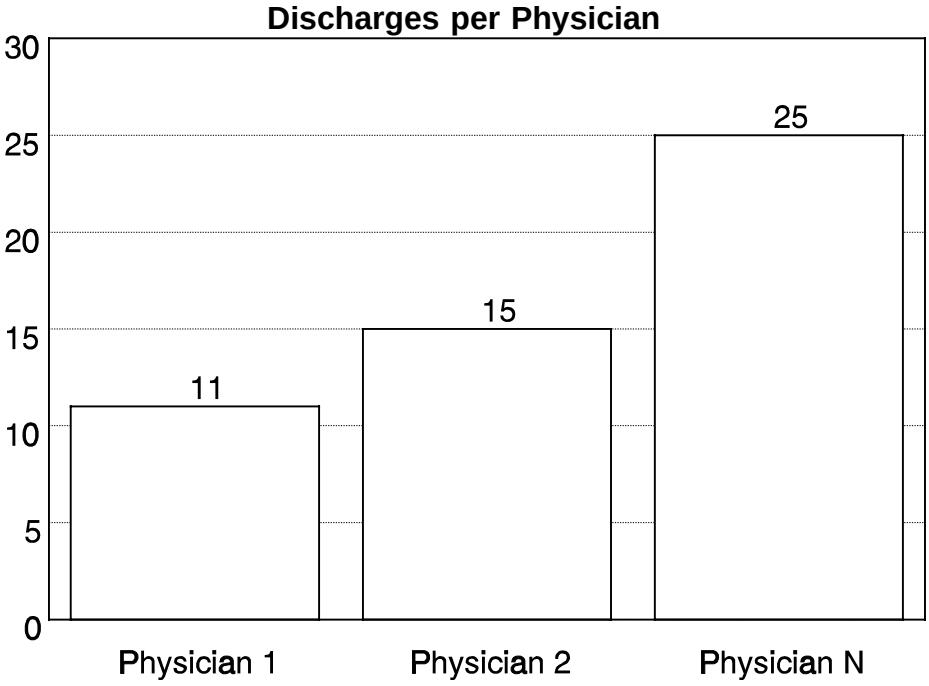
(a) A "plus" (+) is noted for any value showing an increase of more than 10% from the previous month. A "minus" (-) is noted for any value showing an decrease of more than 10% from the previous month.

(b) Rank order is assigned for each category on the report. The rank of "1" is assigned for the greatest value for each indicator. A rank of "n" is assigned to the lowest rate.

Exhibit 5-33
STAFF UTILIZATION — RANK ORDER GRAPHS

Branch Name





5.5.3 Staff Utilization — Trend Report

The trend format for the Staff Utilization Report displays the rates for staff utilization over a rolling 12-month period for the specialty, facility, or branch, as specified when the report is run. This report can be used to indicate seasonal utilization needs of the beneficiary population or it can show the results of staff reassignment at the facility level. The Staff Utilization Trend Report and Graph, as run for a branch, are shown in Exhibits 5-34 and 5-35, respectively.

Exhibit 5-34
STAFF UTILIZATION — TREND REPORT

Branch Name

Reporting Period Run Date

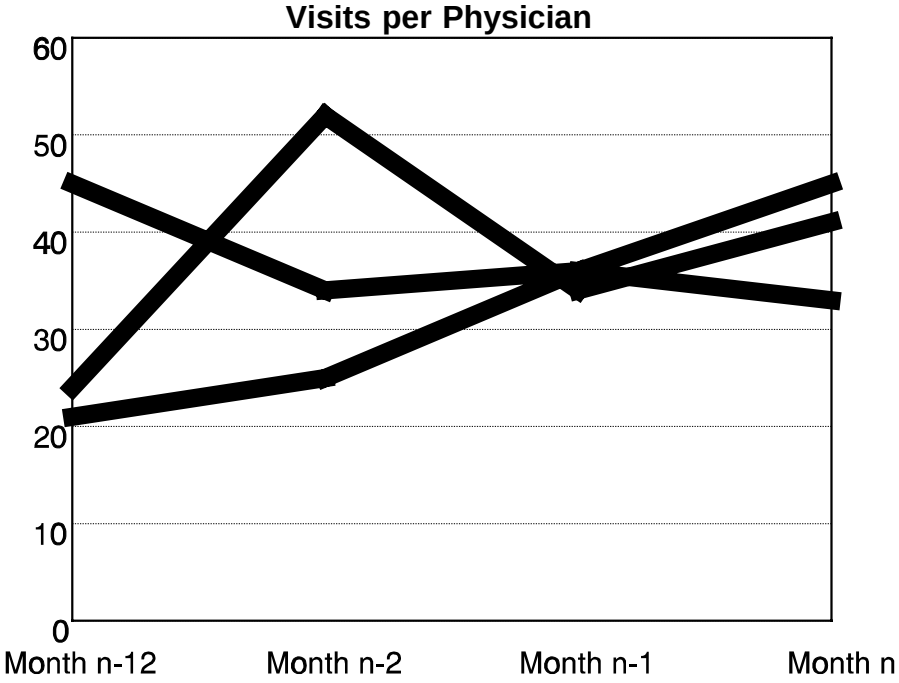
	Current Month (n)	Month (n-1)	Month (n-2)	Month (n-12)	Total	Average
Physicians						
Specialty 1						
Specialty 2						
Specialty N						
Visits per Physician						
Specialty 1						
Specialty 2						
Specialty N						
Discharges per Physician						
Specialty 1						
Specialty 2						
Specialty N						

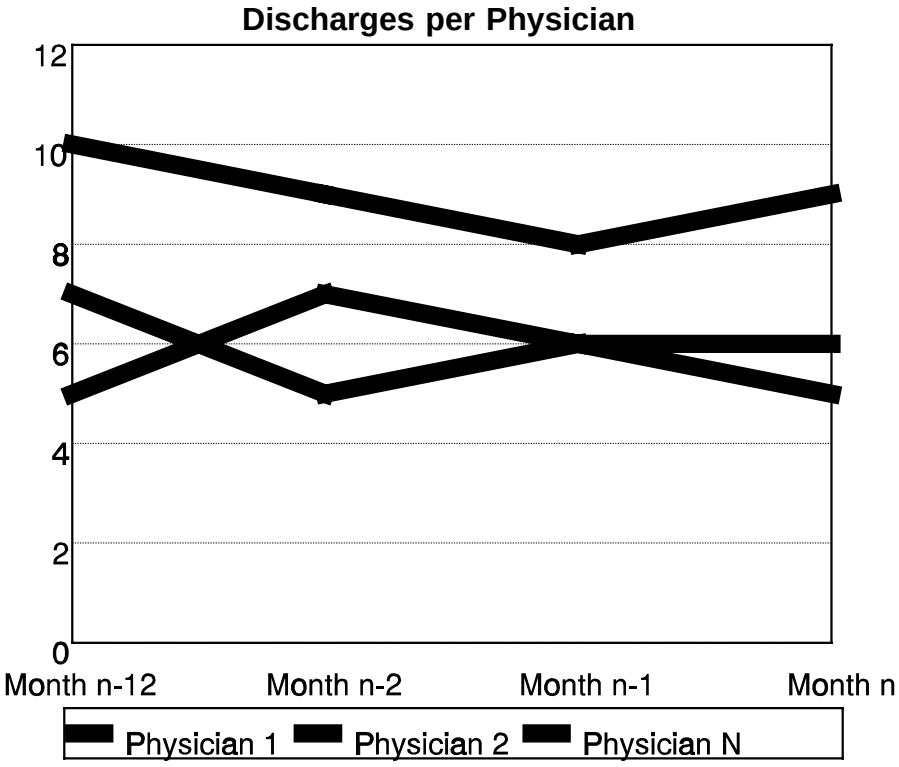
5.5.4 Staff Utilization — Exception Report

An exception report format for the Staff Utilization Report is not available.

Exhibit 5-35
STAFF UTILIZATION — TREND GRAPHS

Branch Name





APPENDIX A

GLOSSARY OF ACRONYMS

APPENDIX A: GLOSSARY OF ACRONYMS

CPT: Current Procedural Terminology

CRHP: Cost Recovery for Health Project

HIO: Health Insurance Organization

ICD: International Classification of Diseases

LOS: Length of Stay

MIS: Management Information System

PC: Personal Computer

USAID: United States Agency for International Development

APPENDIX B

SYSTEM MENU

HEADQUARTERS MENU
MANAGEMENT REPORTS

HEADQUARTERS MENU
SELECT REPORT TYPE

HEADQUARTERS MENU
OUTPATIENT VISITS COMPARATIVE PERFORMANCE REPORT

HEADQUARTERS MENU
OUTPATIENT VISITS RANK ORDER REPORT

HEADQUARTERS MENU
OUTPATIENT VISITS TREND REPORT

HEADQUARTERS MENU
OCCUPANCY AND LENGTH OF STAY RATES COMPARATIVE PERFORMANCE REPORT

HEADQUARTERS MENU
OCCUPANCY AND LENGTH OF STAY RATES RANK ORDER REPORT

HEADQUARTERS MENU
OCCUPANCY AND LENGTH OF STAY RATES TREND REPORT

HEADQUARTERS MENU
DISCHARGE PROFILES COMPARATIVE PERFORMANCE REPORT

HEADQUARTERS MENU
DISCHARGE PROFILES RANK ORDER REPORT

HEADQUARTERS MENU
DISCHARGE PROFILES TREND REPORT

HEADQUARTERS MENU
CONTRACTED SERVICES COMPARATIVE PERFORMANCE REPORT

HEADQUARTERS MENU
CONTRACTED SERVICES RANK ORDER REPORT

HEADQUARTERS MENU
CONTRACTED SERVICES TREND REPORT

HEADQUARTERS MENU
STAFF UTILIZATION COMPARATIVE PERFORMANCE REPORT

HEADQUARTERS MENU
STAFF UTILIZATION RANK ORDER REPORT

HEADQUARTERS MENU
STAFF UTILIZATION TREND REPORT

APPENDIX C

FUNCTIONAL DECOMPOSITIONS

FD-1
HOSPITAL MANAGEMENT APPLICATION

FD-2
POLYCLINIC MANAGEMENT APPLICATION

FD-3
BRANCH MANAGEMENT APPLICATION

FD-4
HEADQUARTERS MANAGEMENT MODULE

APPENDIX D

REFERENCES

MEETING OF 31 MARCH, 1996

Location: HIO Headquarters

Subject: Review Management Reports

Attendee	Title
Dr. Rawash El Deab	HIO Reengineering Implementation Coordinator

MEETING OF 1 APRIL, 1996

Location: Medinat Nasr Hospital

Subject: Pharmacy Procedure

Attendee
Medinat Nasr Pharmacy Staff

MEETING OF 1 APRIL, 1996

Location: Medinat Nasr Hospital

Subject: Hospital Management Procedures

Attendee	Title
Dr. Farouk Abdallah	HIO Quality Assurance Consultant

MEETING OF 6 APRIL, 1996

Location: HIO MIS Center

Subject: Review Management Reports

Attendee	Title
Dr. Samr	HIO Statistician

MEETING OF 7 APRIL, 1996

Location: HIO MIS Center

Subject: Review Management Statistics

Attendee	Title
Dr. Ali El Aroussi	HIO Statistical Manager
Hussam El Alfy	MAXIMUS/HIO Operations Manager